CAVALRY FIELD MANUAL

Volume II

MECHANIZED CAVALRY

Prepared under direction of the
Chief of Cavalry

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Cavalry Field Manual, Volume II, Mechanized Cavalry, is published for the information and guidance of all concerned.

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BY ORDER OF THE SECRETARY OF WAR:

MALIN CRAIG,
Chief of Staff.

OFFICIAL:

E. T. CONLEY,
Major General,
The Adjutant General.

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VOLUME II

MECHANIZED CAVALRY

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CHAPTER 1

INDIVIDUAL INSTRUCTION

SECTION I

GENERAL

1. Purpose of instruction.—*a.* The purpose of instruction with motor driven vehicles is to train individual soldiers of mechanized organizations in the care and operation of the vehicles for combat.

b. As the horse is the basic element of horse cavalry, so the motor vehicle is the basic element of mechanized cavalry. Upon the condition of its motor vehicles depends the successful accomplishment of its mission. All rules and practices necessary to correct handling of motor vehicles under both normal and adverse conditions must be learned and followed in detail by all men of mechanized organizations.

2. Concurrent instruction.—The training of the soldier in driver's maintenance and in operation of motor vehicles is carried on concurrently. A good driver is one who not only handles his vehicle with ease, sureness, and precision but one who knows how to inspect and lubricate it, and perform the other essentials

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of 1st echelon maintenance. Accordingly, to enable the recruit to become a good driver, he is carefully instructed in both the operation and care of motor vehicles.

3. **Scope of instruction.**—All men are trained as drivers of conventional type vehicles. Selected men are given further training in the operation of special type vehicles. All men so transported, except Medical Department personnel, must be further trained in the use of the pistol, machine gun and submachine gun, both mounted and dismounted, and in the fundamental principles of dismounted combat. Cavalry mechanized and motorized units cannot afford to carry any personnel, except Medical Department, who are not trained in the use of weapons and dismounted combat. For instruction in driving, the recruit is mounted on a light, wheeled vehicle with standard gear shift. After he has mastered the operation of this type vehicle, he is given instruction in the operation of multiwheeled, multiaxled vehicles with more complex transmissions, including cross-country driving with four-wheel drive vehicles. Immediately upon the completion of the recruit period, instruction in the operation and care of track-laying vehicles is given all personnel of organizations so equipped. Motorcycle instruction is given selected men. Too much stress cannot be paid on the desirability of instructing the recruit in the care of vehicles at the same time he is being instructed in their operation. The new driver who learns the mechanism of his vehicle realizes the ill effects of bad driving. Men who know their vehicles make good drivers.

SECTION II

DRIVING AND CARE OF VEHICLE

4. **Responsibility of driver.**—*a.* Each vehicle has an assigned driver. He is responsible for operating and maintaining his vehicle to assure its operation at maximum efficiency. The length of life and the amount of service rendered by a motor vehicle are largely dependent on the driver. He should be able to recognize immediately any unusual noise or abnormal condition in his vehicle. It is an established fact in motor organizations that those vehicles giving the most reliable service are those to which drivers are permanently assigned. For this reason commanders should be deliberate in changing assignments once made.

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b. The driver's duties are exacting and definitely fixed. He must know what to do and what not to do, both in the handling and the upkeep of the vehicle. The scope of the driver's responsibilities for maintenance includes the correct driving, the cleaning and lubrication of the vehicle (with exception of the generator, magneto, and distributor), and the tightening of loose parts. He maintains in proper condition the radiator, storage battery terminals, and tires. Any work on the interior of the engine, other than the draining and filling of the crankcase, is performed by mechanics. The driver is taught and required to fulfill to the letter the requirements of the lubrication chart furnished with all vehicles. Daily inspections are important in order to locate deficiencies. Deficiencies which are beyond the scope of his activities are promptly reported to his car commander or immediate superior.

5. Driving instruction.—Driving instruction includes the following for all types of vehicles:

a. Preliminary inspection of vehicle for serviceability.
b. Shifting gears.
c. Manipulation of clutch.
d. Steering.
e. Turning.
f. Backing.
g. Use of brakes.
h. Starting and stopping.
i. Rules of the road.
j. Driving on highways.
k. Marching.
l. Cross-country driving.
m. Night driving with and without lights.
n. Examination of the driver.

6. The track vehicle.—Driving the track vehicle presents such different problems from those of the wheel vehicle that such training should not commence until the student is not only thoroughly competent in driving the wheel type but also has demonstrated handling the controls with quickness, coolness, and smoothness. This is necessary because of the different types of controls and also on account of the potential destructive power of the vehicle itself. The lightest and slowest type of vehicle available should be used at the beginning and the stu-

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dent should become expert with it before passing to heavier or faster vehicles.

a. Due to the fact that the track controls vary in type, the student should be given instruction with the vehicle standing before being allowed to handle the vehicle in motion. Instructions with the vehicle standing at a halt should be given in the following order and the student should be proficient in each subject before the next one is taken up.

(1) Signals.

(2) Controls; use of each and drill in their application, doors open.

(3) Practice as above with doors closed.

b. When the student has become proficient at driving with the vehicle standing, he then takes up actual driving in the steps given below, first with the doors open and then with the doors closed. The student at the controls, with the instructor seated at his side, begins actual driving as follows:

(1) In low gear, for short distances, and over relatively smooth ground free from obstacles.

(2) With several obstacles to negotiate.

NOTE.—The above two steps should be carried out with the doors closed. Care must be taken that two vehicles do not operate within 100 yards of each other at this particular stage.

(3) The student then drives short courses of his own.

(4) Second and higher gears are introduced in the manner prescribed for low gear.

(5) The student alone then drives over a staked out course. This course should be considered as a proficiency test.

7. Cross-country driving.—*a.* After student drivers have demonstrated their ability to drive motor vehicles on good roads with deftness and precision and have further shown good judgment in the maneuvering of their vehicles in traffic, instruction in cross-country driving is begun. Development of drivers who can maneuver motor vehicles across country and reach a definite objective is the desired goal.

b. Cross-country wheeled vehicles are usually provided with high and low gear ranges, center differential locking devices, and four-wheel drive traction. These should be explained thoroughly both in principle and operation and then demonstrated before the driver attempts their use.

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c. The first principle of cross-country driving with wheeled vehicles is that obstacles are to be avoided. It is only when an obstacle cannot be avoided that it is negotiated. The best cross-country driver is not the one who reaches his objective first, but the first driver who reaches his objective with an undamaged vehicle ready to continue its march. The student sits beside an experienced cross-country driver and is shown the practical applications of the devices provided for negotiating cross-country terrain. He is shown the proper use and application of the traction afforded by four-wheel drive vehicles. He is shown how and when, by use of the center differential lock, equal tractive force is applied to each wheel. He is shown how to ease his vehicle in and out of ditches, over unavoidable obstacles, and up or down difficult grades by use of his four-wheel drive and high and low gear ranges. The training of drivers is not complete until each has demonstrated his ability to operate his vehicle with a sureness and precision across country approximating that possible on improved roads.

8. Night driving.—Thorough instruction in night driving, with and without lights, is given each driver. As much driving of this type will be required in the field, it is important that this part of the driver's training is not neglected. Men differ greatly in their natural ability to see and drive at night without lights. Tests in night driving without lights should be given as soon as student drivers become reasonably proficient to insure that only men who are physically qualified are given permanent assignment as drivers.

SECTION III

THE MOTORCYCLIST

9. Instruction.—Instruction in riding the motorcycle is divided into two parts, dismounted and mounted. Where possible, the soldier should be able to ride a bicycle before receiving instruction on the motorcycle.

a. Dismounted.—This instruction may be given indoors, in the shop, or at the motor park. The student is taught the nomenclature and location of the principal parts of his vehicle. As he becomes thoroughly familiar with these he is taught the

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cleaning, care, adjustments, and minor repairs that he will be required to make in the proper maintenance of his vehicle. This instruction will also include a brief discussion of the more serious mechanical difficulties that may arise, so that the student may recognize them and make an intelligent report in case of a breakdown on the road.

b. Mounted.—(1) This phase of instruction should not be started until the soldier has become proficient in the dismounted phase. Only careful and experienced drivers should be used as instructors. The early instruction should take place in a large, open, level area, preferably sodded, where the ground is firm and smooth but not hard enough to injure the soldier or his vehicle in case of a fall. In order to prevent accidents the instruction should proceed slowly under close supervision.

(2) With the machine at rest on the stand the student mounts and familiarizes himself with the controls, first with the engine at rest and then with the engine running. Next he is shown how to maneuver the motorcycle by pushing it; the early instruction should include much of this as it gives the man the feel of the machine and increases his confidence when he starts it under power. The next step is to start the engine and, in low gear, move a few feet in a straight line. As confidence is gained the distance moved is increased and later the gears are changed. When the man has become proficient on the drill field he should be taken on the road and over difficult ground.

10. Motorcycle maintenance.—The motorcyclist is responsible for the proper maintenance of his vehicle and makes the necessary adjustments and minor repairs as outlined below. Any other work on his machine is performed by mechanics.

a. Daily.—Each day upon taking the vehicle out and upon returning it to the park he verifies and corrects when necessary—

(1) Brake adjustments.
(2) Horn.
(3) Lights.
(4) Tire inflation.
(5) Oil supply.
(6) Gasoline supply.

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b. Weekly.—Once a week he goes over his vehicle thoroughly and performs the following maintenance:

(1) Tightens hub nuts, spoke nipples, lamp brackets, engine and transmission bolts, and leakage to transmission, carburetor, distributor, and brushes.

(2) Greases all fittings.

(3) Adds distilled water and tightens cables in battery.

(4) Adjusts shackle and lubricates chain.

(5) Washes and polishes.

c. Monthly, or according to mileage.—Once a month, or according to the mileage performed by the vehicle, he drains and refills the engine crankcase and transmission with fresh lubricants.

SECTION IV

SPECIAL INSTRUCTIONS FOR DRIVERS AND OCCUPANTS

11. Car commander and driver.—The relations of the driver of a motor vehicle and his car commander or section leader are analogous to those of the mounted trooper and his squad leader. The car commander or section leader gives his instructions or signals, which are duly executed by the driver. The car commander directs the loading and disposition of cargo and passengers.

12. Occupants.—The occupants of military motor vehicles are considered in formation and do not leave the vehicle without proper authority. No passenger rides on the left of the driver in the driver's seat nor does any passenger occupy any part of the vehicle so as to obstruct the view of the driver. In passenger cars all doors are kept closed while the vehicle is in motion. Passengers keep wholly inside the vehicles unless specifically directed otherwise. On trucks, tail gates are kept closed while trucks are in motion.

a. In ceremonies.—In parades or review enlisted men occupying vehicles, except drivers, fold the arms across the breast while passing the reviewing stand.

b. Attention.—The position of attention assumed by occupants of motor vehicles is an alert position, with back erect, the chest lifted, shoulders squared, head up, eyes straight in the direction the occupant is facing, arms falling naturally at the side. Silence is maintained.

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c. Rests.—The commands are: ***AT EASE; REST; ROUTE ORDER.***

(1) At the command ***At ease,*** occupants of motor vehicles may assume a relaxed posture but do not leave their positions in the vehicle. Silence is maintained.

(2) At the command ***Rest,*** positions are maintained, comfortable postures may be assumed, and occupants may talk.

(3) ***Route order*** is the habitual march order. On long marches and in the zone of combat, where every opportunity for sleep or rest must be taken, occupants of motor vehicles not specifically on duty may dispose themselves so as to secure the most comfort and rest.

d. Smoking.—Occupants of motor vehicles smoke only at the ***Route order,*** and then only when specific permission has been granted for smoking in the type vehicle they occupy.

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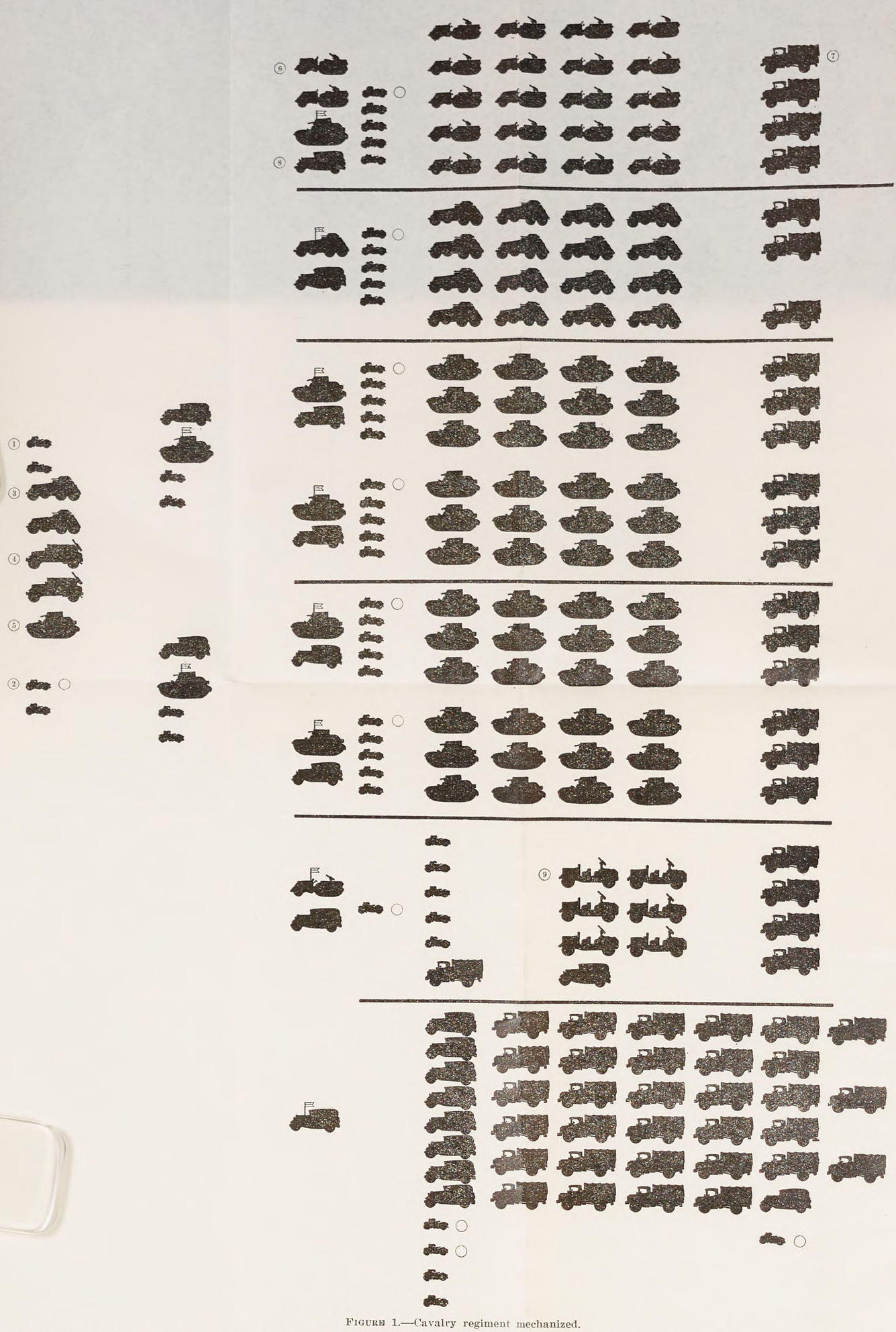

FIGURE 1.—Cavalry regiment mechanized.

1. Motorcycle, solo. 2. Motorcycle with sidecar. 3. Armored car. 4. Scout car. 5. Combat car. 6. Personnel carrier. 7. Truck. 8. Car, 5-passenger. 9. Mortar mount, self-propelled.

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CHAPTER 2

DRILL

SECTION I

GENERAL

13. General rules.—*a.* The forming of line and column and the designation of the base unit are the same as prescribed for horse cavalry.

b. The speed of the base unit is regulated by the leader to facilitate the completion of the movement at the earliest practicable moment.

c. Dismounted drill conforms to that prescribed for horse cavalry. For dismounted movements the element is normally formed in single rank and maneuvered by fours. In dismounted combat the car crew fights dismounted as a squad.

d. In all elements to include the squadron, the commander leads all maneuver up to the assault, at which time he is absorbed in the formation.

14. Commands and signals.—*a.* Commands correspond to those of horse units, except that in mounted maneuver there is generally no command of execution. Movements are initiated as soon as the command is understood, bearing in mind the principles of leading.

b. Commands are given by—

(1) Voice (seldom practicable, mounted).
(2) Whistle or horn.
(3) Radio, voice or telegraph.
(4) Arm signal and touch signal.
(5) Flag or light signal (color).
(6) Example of the leader.

c. Special flag signals for armored car units are prescribed in paragraph 20.

d. Special signals for combat car troops are prescribed in paragraph 27.

15. Formations.—*a. Normal.*—(1) In normal formations within each troop, distances and intervals of 15 yards are main-

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tained between all vehicles except motorcycles. For example, the platoon leader's command car of the base platoon is 15 yards distant from the troop commander's car. In line formations, cars within a platoon are at 15 yards interval. In column formations, cars within a platoon are at 15 yards distance. The adjacent flank cars of adjacent platoons in line are at 15 yards interval (except when echeloned in marching). In echelon, cars are spaced at 15 yards interval and 15 yards distance. In column, the platoon leader's car follows the rear car of the preceding platoon at 15 yards distance.

(2) Motorcycles march in the space between cars and on that flank of the unit commander's car which will permit the easiest communication.

(3) Normal formations for all troops and platoons are—

(*a*) Line.

(*b*) Column.

(*c*) Echelon.

(*d*) Line of platoon columns.

(*e*) Column of platoons.

(4) When the troop marches in line, platoons other than the base echelon on the platoon next toward the base so that the platoon leader's car is abreast the rank of the next platoon toward the base. The troop halts on one line except the troop commander's car, which halts in front.

(5) Normal column formation is prescribed for road marches. Factors of safety, weather, light, road conditions, and rate of march frequently dictate increased distances between vehicles, platoons, and larger units.

b. Extended.—(1) Any normal formation may be extended. When it is so extended it is known as extended formation of the same name.

(2) Extended formations occupy such an extent of ground that great latitude is given car commanders in selecting routes and speeds so as best to maintain the general formation of the element. Extended formations are designed for combat; therefore, car commanders must be especially alert to conform promptly to the commands and example of platoon leaders.

c. Close.—(1) Any normal formation may be closed and then becomes a close formation of the same name.

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(2) Close formations are especially applicable to ceremonies and camps.

(3) Normally no evolution of drill other than corrections of alinement are made in close formation.

SECTION II

ARMORED CAR TROOP

16. Base element.—Each base element follows its leader, moving in his trace or on the point designated by him, and at his speed. The other elements regulate and dress on the base element unless otherwise ordered. The base element is normally the center or right center element in line and the leading element in column. The leader may designate any element as the base. Elements are led to their places by the shortest route.

17. Speeds.—Ordinarily the speed of the base unit will be from 10 to 25 miles per hour. When line is formed from column, the rear elements increase their speed without command. Column is formed to the front on the base element at the speed of march. The leader of the base regulates his speed so as to facilitate the formation or to attain the objective in view. All increases and decreases of speed are executed smoothly and gradually.

18. Change of direction.—All turns or changes of direction are executed on a radius of 15 yards without change of speed.

19. Backing.—This is an exceptional movement. Execution requires each vehicle to be guided by an observer watching to the rear.

20. Signals.—In addition to the signals prescribed in paragraph 14, the following flag signals are authorized for tactical purposes:

a. Mounted enemy.—Yellow flag waved and pointed in direction of the enemy.

b. Dismounted enemy.—Yellow flag stationary and pointed in direction of enemy.

21. The crew.—*a. To dismount.*—Being at the halt, with the platoons in any formation the commands are: 1. ***Dismounted posts,*** 2. ***MARCH.*** The members of each car crew dismount and take position of attention one yard in front of their vehicle

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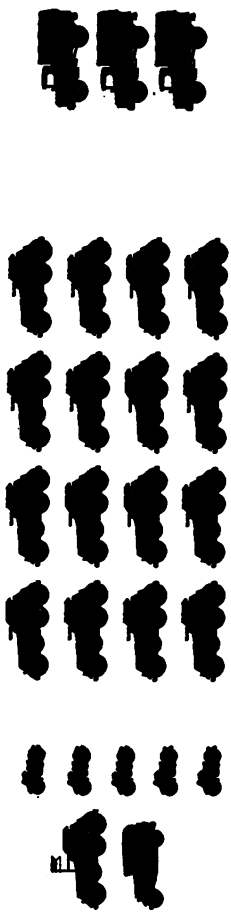

FIGURE 2.—Armored car troop (reconnaissance).

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in the following order from right to left: car commander, gunner, assistant gunner, driver. The platoon motorcyclist takes post in the space vacated by the platoon leader who takes post two yards in front of the center of his car crew. The radio operator remains mounted unless specifically ordered to dismount.

b. To mount.—(1) At the command ***Mount*** (vehicles in any formation at a halt), all members of the car crew, except the driver, turn to the right and enter the vehicle. The driver turns to the left and enters the vehicle. Members of the car crew take post in the vehicle as follows:

(*a*) *Driver.*—The driving compartment.

(*b*) *Car commander.*—The turret (except in ceremonies when he sits next to the driver).

(*c*) *Gunner.*—The rear compartment.

(*d*) *Assistant gunner.*—Next to driver.

(2) The gunner assists in transmitting the orders of the car commander to the driver. The assistant gunner observes to the right for the purpose of assisting the driver.

c. Ports.—Ports are opened or closed as ordered. Normally they will be closed when the car is under hostile fire.

d. Prepare for action.—At the command ***Action,*** each man takes his proper post in the vehicle, guns are half loaded, and preparations made for immediate action.

22. The section.—The section executes all movements prescribed for the car crew and in addition combat formations. (See fig. 3.) Tactical or combat situations will require the following modifications:

a. When the section is operating alone the No. 2 car of the section is sent ahead at an increased distance as a point.

b. If the situation requires the section to operate in line, the interval is not fixed but is flexible to allow individual vehicles to take advantage of cover and the best routes of advance.

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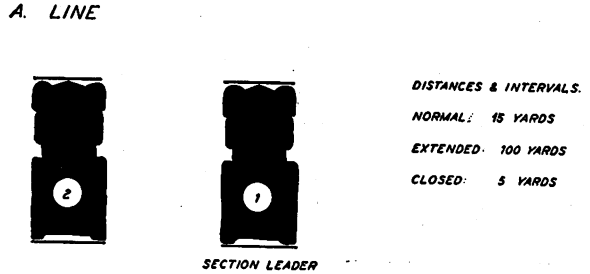

FIGURE 3.—The section (armored car troop).

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23. The platoon.—*a.* The platoon executes all the movements prescribed for the section. When moving in line or column, the platoon leader leads his platoon except when tactical and combat considerations require otherwise. (See fig. 4.)

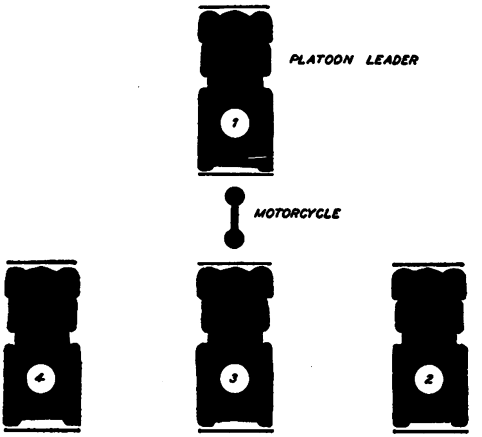

FIGURE 4.—The platoon in line (armored car troop).

b. For tactical and combat formations, the platoon leader's car is the second in column, being preceded by the other car of his section as a point. In line, the platoon leader occupies a position in the line, the second section on his left and the No. 1 car of the first section on his right.

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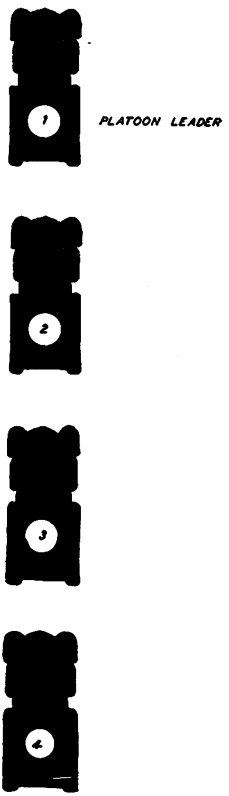

FIGURE 5.—The platoon in column (armored car troop).

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24. The troop.—There are no combat formations prescribed for the troop since the troop does not operate as a tactical unit. The platoon is the basic tactical unit of the armored car troop. The only troop formations considered are those for ceremonies and marches.

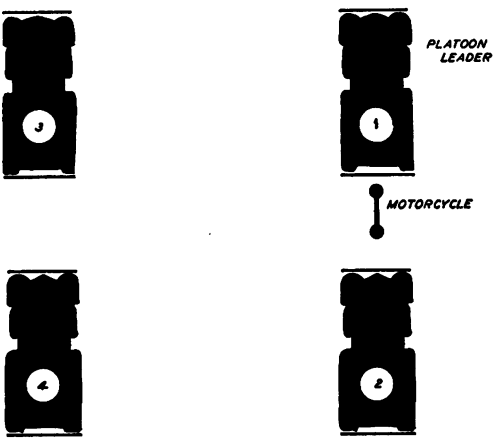

FIGURE 6.—The platoon in line of sections (armored car troop).

a. Column (fig. 7).—(1) This formation is for all administrative marches.

(2) Distances vary from two vehicle lengths to 50 yards, depending on driving conditions and rate of march.

(3) At the halt, all vehicles close on the vehicle in front.

(4) All motorcycles except two precede the troop to control traffic.

(5) One motorcycle follows the troop commander's car and one follows the executive officer's car. These are for the purpose of passing messages back and forth, since the radio sets in these cars generally operate on different frequencies.

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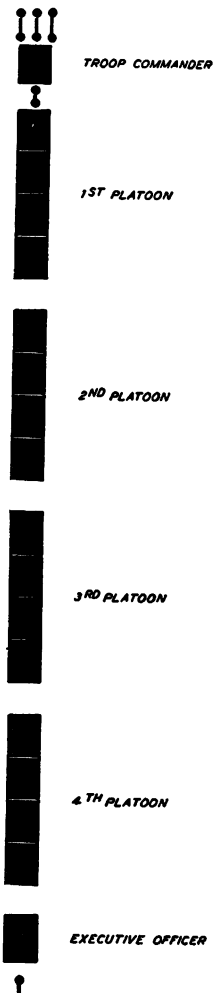

FIGURE 7.—Armored car troop in column.

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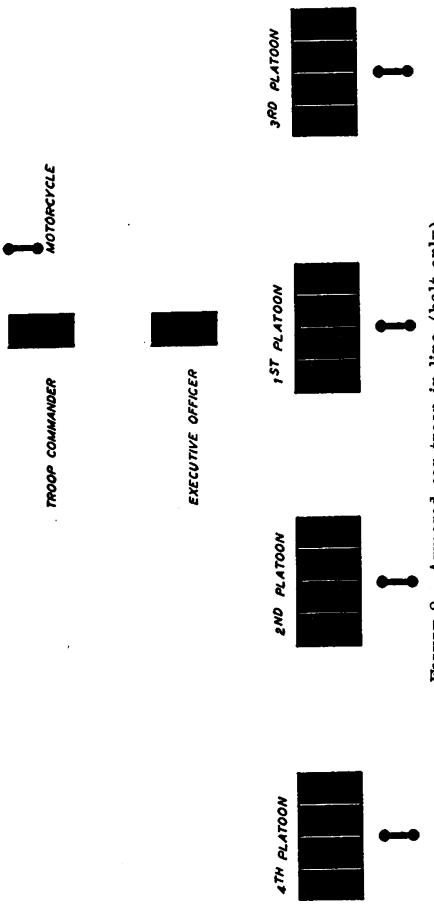

FIGURE 8.—Armored car troop in line (halt only).

b. Line (halt only) (fig. 8).—(1) The executive officer's car is 3 yards in front of the No. 1 car of the first platoon.

(2) The troop commander's car is 3 yards in front of executive officer's car.

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(3) If additional motorcycles are attached or assigned to the troop, they follow the troop commander's car.

c. Column of platoons (fig. 9).—(1) The executive officer's car is 10 yards in front of the No. 1 car of the first platoon.

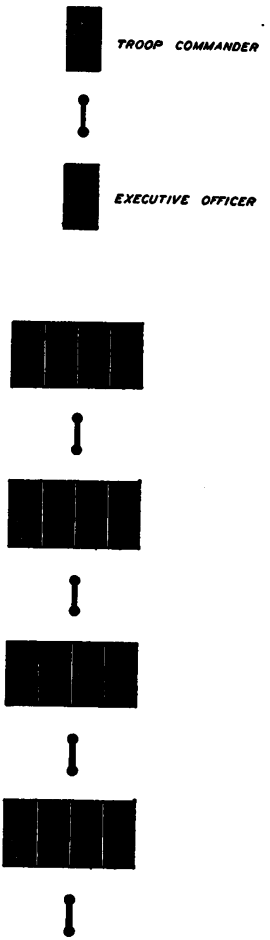

FIGURE 9.—Armored car troop in column of platoons.

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(2) The troop commander's car is 10 yards in front of executive officer's car.

d. Line of platoon columns (fig. 10).—(1) The troop commander's car is 5 yards in front of right center platoon.

(2) The executive officer's car is 5 yards in front of left center platoon.

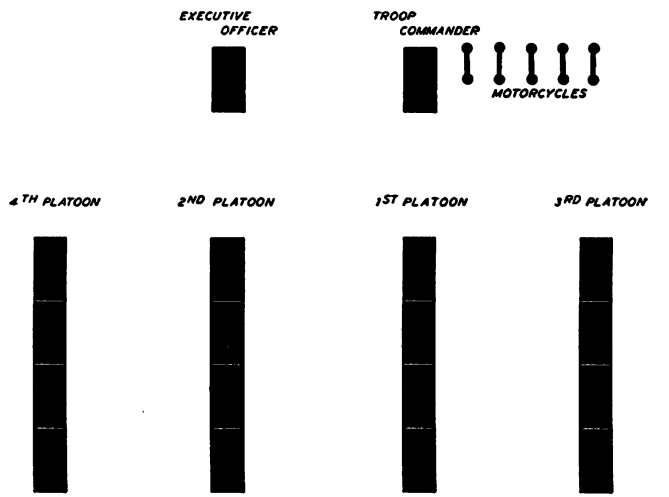

FIGURE 10.—Armored car troop in line of platoon columns.

SECTION III

COMBAT CAR SQUADRON

25. Drill.—*a.* Combat car drill bears the same relation to combat exercises that the cavalry drill mounted does to cavalry combat exercises. It is the foundation of that discipline which insures teamwork under difficult conditions and ultimately brings success in battle.

b. Drill movements normally are executed with the base element marching at speeds from 5 to 25 miles per hour, depending on the terrain and nature of the movement. The speed of the base element is as nearly uniform as possible, although successful leadership necessitates the unit commander varying

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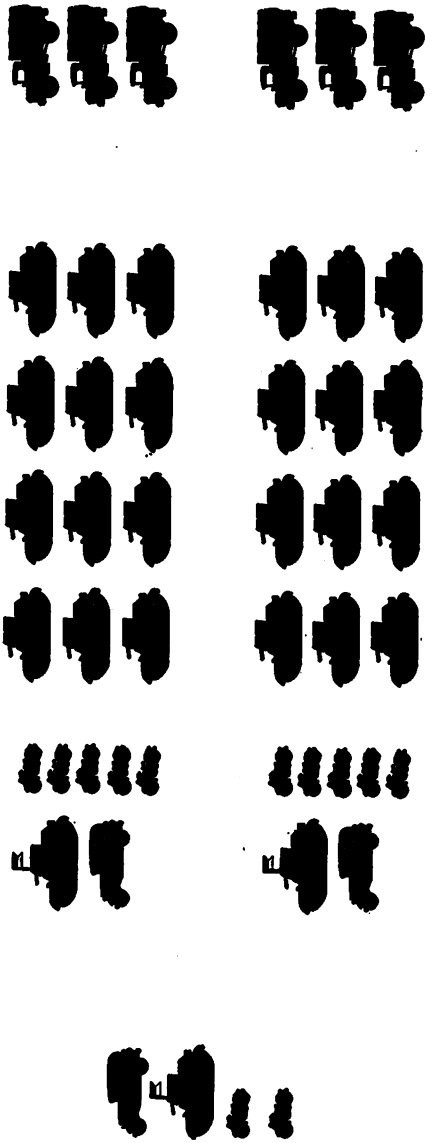

FIGURE 11.—Combat car squadron.

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the speed of his base during an evolution, while other elements increase or decrease their speed so that the unit may complete the movement and resume normal speed at the earliest practicable moment.

c. Ports in the driver's compartment are opened or closed upon order of the unit commander; in combat, upon order of the car commander. On maneuvers, where the enemy is outlined or represented by other troops, ports are habitually kept open. In general, they are kept open to facilitate observation except when hostile fire forces their closing.

d. No one is permitted to ride on the outside of a combat car at any time.

26. Formations.—*a.* There are three formations or orders; close, normal, and extended.

(1) *Close order.*—Close order is used for parades and ceremonies. Intervals and distances are reduced to 5 yards.

(2) *Normal order.*—This is the usual drill formation. Intervals and distances are fixed at 15 yards when moving, and at all halts in any formation are reduced to 5 yards. Upon halting in normal order, all units reduce their intervals and distances to those prescribed for close order.

(3) *Extended order.*—Extended order is used for the basic battle formations. Intervals are extended from 100 to 150 yards between cars and distances are reduced or extended as the nature of the terrain, dispositions of the enemy, and exigencies of the situation may demand. Upon halting, relative positions are retained without closing.

b. All movements involving two or more platoons at close and normal distances are successive movements.

27. Signals.—The signals covered herein are in addition to those prescribed in paragraph 14 and include flag, arm, light, and touch signals. Such pyrotechnic signals as may be desired are prescribed in field orders.

a. Flag signals.—Four tank signal flags per car are used for intercar communication. They may be displayed through any openings of the car turret. Under favorable conditions this system is practical up to and including the troop. The combat car squadron may be so drilled but the use of mounted motorcycle messengers may frequently supplement the flag signals.

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The lowering of a signal flag by a commander is the signal of execution. Promptness in the transmission of signals is important. The following code will be used:

(1) *Do as I do.*—Yellow. A flag which by the manner of its display denotes the desires of the element commander as to changes of direction either of units or of individual cars.

(2) *Line.*—Blue. Held vertical and stationary. It may also denote *Echelon right* (*left*) when displayed horizontally to the right (left) of the turret.

(3) *Column.*—Red. Held vertical and stationary.

(4) *Extend.*—White. When displayed, elements take up the next most extended formation or order; that is, if displayed in normal order at 15 yards distance and interval, it denotes extended order.

(5) *Assemble* or *Close.*—Red and blue. When displayed, elements close to the next least extended order.

NOTE.—Signals (1) to (5) generally suffice for the platoon.

(6) *Line of platoon columns.*—White and blue. Displayed vertically and stationary.

(7) *Column of platoon.*—White and red.

NOTE.—Signals (1) to (7) will drill the troop, the white flag in combination with a basic flag denoting *platoon.*

(8) *Line of troop columns.*—Yellow and blue. Displayed vertically and stationary.

(9) *Column of troops.*—Yellow and red. Displayed vertically and stationary.

(10) *Column of troops* or *Troops in line of platoon columns.*—Yellow and white.

NOTE.—Signals (1) to (10) will drill the squadron, the yellow flag in combination with a basic flag denoting *troop.*

b. Arm signals.—(1) *Dismounted.*—Arm signals may be used in daylight by a guide outside the combat car to control its movements. The guide places and keeps himself in view of the driver. He may face toward or away from the driver while signaling. Arm signals are also used mounted in transmitting administrative orders. The following code will be used:

(*a*) *Start engine.*—Simulate cranking.

(*b*) *Stop engine.*—Cross forearms overhead.

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(*c*) *Mount.*—Extend either arm horizontally from shoulder, palm up, and move upward overhead to vertical position and then back to horizontal, repeating as necessary.

(*d*) *Dismount.*—Extend either arm horizontally from shoulder, palm down, and move downward to body and back to horizontal position, repeating as necessary.

(*e*) *Move ahead.*—Beckon to driver with hand.

(*f*) *Come here.*—(When at a distance from car.) Extend hand and arm to full extent toward unit, sweeping same overhead and forward, indicating the point to which it is desired car shall move.

(*g*) *Move faster.*—Carry fist to shoulder. Rapidly thrust fist up and down several times.

(*h*) *Move slower.*—Extend arm horizontally from shoulder, palm to front, and move hand up and down vertically about 12 inches several times.

(*i*) *Change direction right* (*left*).—Short outward jerks of the fist to the right (left). The driver continues to turn until the jerks cease.

(*j*) *Change direction right* (*left*).—(When at a distance from car.) Extend hand and arm to full extent toward unit, sweeping same overhead and forward in direction in which it is desired car shall move.

(*k*) *Halt.*—Extend hand and arm to vertical position, palm toward driver or element for whom signal is intended, and hold stationary.

(*l*) *Move in reverse.*—Extend hand and arm, palm toward driver, and make pushing motion.

(*m*) *Caution.*—(For gaging distance in confined space.) Extend both arms forward laterally, palms toward each other, until they meet at the instant it is desired to stop the car.

(2) *Mounted.*—The following arm signals are prescribed when mounted:

(*a*) *Close up.*—Extend the arms horizontally sideward, palms up, and swing them upward to the vertical position overhead until the palms meet.

(*b*) *Increase the speed.*—Same as (1) (*g*) above.

(*c*) *Slow down.*—Same as (1) (*h*) above.

(*d*) *Prepare for action.*—Simulate loading a machine gun as though working the bolt.

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(*e*) *Out of action.*—Both arms extended obliquely upward, palms forward.

(*f*) *Are you ready?*—Extend arm forward and upward toward the unit in question, with palm forward.

c. Light signals.—In moving at night, combat car columns should be habitually controlled by means of flashlight signals, the light being subdued to meet the exigencies of the operation.

d. Touch signals.—(1) Touch signals are for communication between the combat car commander and his driver. The following code will be used:

(*a*) *Move forward.*—Tap repeatedly between the shoulder blades.

(*b*) *Move faster.*—Same as (*a*) above.

(*c*) *Move slower.*—Several slow pushes between the shoulder blades.

(*d*) *Halt.*—A continuous push between the shoulder blades.

(*e*) *Change direction right* (*left*).—Apply pressure on the driver's shoulder on the side toward which it is desired to turn.

(*f*) *Move in reverse.*—Tap repeatedly on helmet.

(2) As signals are usually transmitted by the car commander's foot, care should be taken to avoid inconveniencing and irritating the driver. To this end care should be taken, especially under the exciting influence of action, either real or simulated, to use no more force than necessary.

(3) Turns and moves in reverse will be continued only as long as the taps are continued.

(4) Increases and decreases of speed, changes of direction, etc., must be made smoothly and gradually.

28. Designation of platoons.—*a.* The cavalry combat car troop consists of 4 combat car platoons and a troop headquarters. For administrative purposes combat car platoons have permanent designations as 1st platoon, 2d platoon, etc., which have no connection with their temporary designations according to their positions in line or column at drill.

b. For the purposes of drill and tactical employment, the elements of a combat car troop commonly designated as platoons are known solely by number. This system of numbering is based on the relative positions of the elements involved. Position No. 1 is habitually the base position and the element in

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position No. 1 is always the leading element. In column or any formation in depth, elements are numbered from head to rear. In line or in any formation involving lateral dispersion, elements are numbered consecutively, commencing with that element in the base position and continuing alternately left and right. No. 4 position is normally the rear position. (See fig. 12.) This system of designation gives a normal diamond formation capable of quick and easy change of direction, thus facilitating employment of the troop.

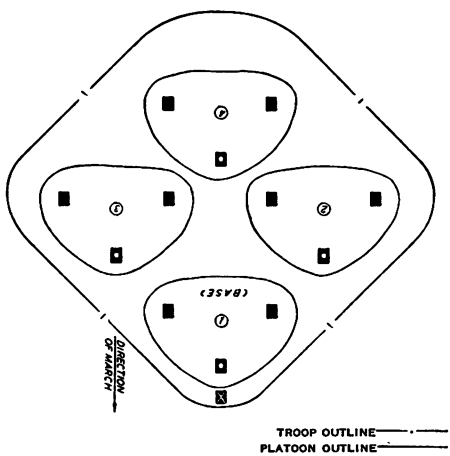

FIGURE 12.—Positions of platoons in line moving (combat car troop).

29. The crew.—The combat car crew consists of four members—car commander, gunner, driver, and assistant driver. In command cars, the gunner is replaced by a radio operator also trained in the duties of gunner.

a. Posts of the crew.—(1) *Dismounted.*—(*a*) The crew forms dismounted in line with the right man one yard in front of the right track driving sprocket, in order from right to left: car commander, gunner, assistant driver, driver.

(*b*) Being dismounted, the crew takes dismounted posts at the command ***Fall in*** or ***Stand to car.***

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(*c*) The crew being formed dismounted, at the command ***Fall out,*** the crew breaks rank and the troopers habitually fall out to the right of their car. (See fig. 13.)

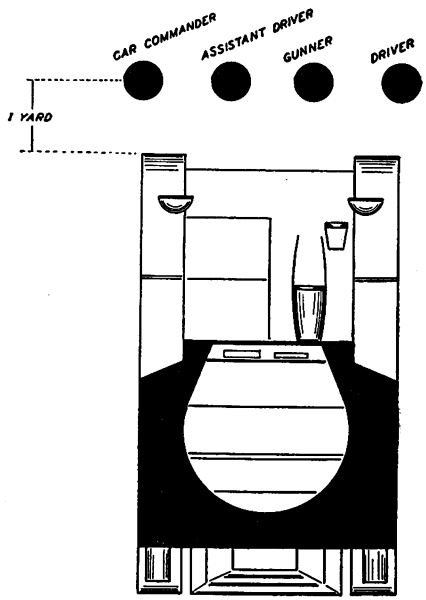

FIGURE 13.—Position of combat car personnel dismounted.

(2) *Mounted.*—(*a*) The crew forms mounted as follows:

1. Driver.—In driver's seat.

2. Assistant driver.—In right front seat behind cowl gun.

3. Gunner.—In right rear seat. (This is also the radio operator's post.)

4. Car commander.—Stands on power shaft housing, head and shoulders exposed through top of turret.

(*b*) At the command ***Prepare for action,*** driver and car commander exercise due caution to avoid exposure of person and close the ports should the occasion warrant. The gunner loads both turret guns and assumes firing position as directed by the car commander. The assistant driver loads the cowl gun and

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assists closing the ports as necessary. (In the case of command cars the radio operator is the gunner and prepares the turret guns.)

b. To mount the crew.—Being at their posts dismounted, at the command or signal ***Mount,*** the members of the crew face the car. Stepping to the front stirrup, front plate, left mud guard, and top deck, the car commander posts himself at the left rear of turret, followed immediately by the assistant driver who drops into the turret, assuming his proper post. The gunner, mounting to the left mud guard, stoops, raises the driver's port to the vertical and, after the driver's entry, lowers port, mounts to top deck, and drops into turret to his post, followed by the car commander who drops to the power shaft housing. When the car commander has taken his position in his turret the combat car is ready to move without further signal. In the case of command cars the assistant driver performs the duties herein prescribed for the gunner.

c. To dismount the crew.—Being at their posts mounted, at the command or signal ***Dismount,*** the car commander emerges from his turret and assumes post at left rear of turret, followed by the gunner, who descends to the left mud guard and raises the driver's port. After the driver has emerged the driver's port is lowered to its open position. All descend to the ground, with the car commander the last to dismount. Each proceeds to his prescribed position, dismounted, by the most direct route, falling in at attention without further command. In the case of command cars the radio operator remains mounted as long as his station is open, the assistant driver performing those duties herein prescribed for the gunner.

d. To abandon car.—At the command ***Abandon car,*** the crew dismounts from the combat car as expeditiously as possible. The gunner and car commander remove the ground machine gun and mount it on the emergency tripod. The assistant driver removes five belts of ammunition, takes them to gun position, and returns at once to the car. He then places the spare parts box and ramrod in a convenient position and mans the remaining turret weapon. He disables the cowl gun by removing its bolt. The driver disables his engine as may be directed. He then dismounts with submachine gun and takes position as directed by the car commander. Should the assistant driver be

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forced to evacuate the car, he disables his turret gun by removing its bolt, secures extra belts of ammunition for the ground gun, ramrod, and spare parts box and, under protection of the driver, dismounts and proceeds to the position of the ground gun.

30. The platoon.—*a. Organization.*—Three combat cars, one the command or base car, constitute a platoon.

b. Drill.—(1) The drills prescribed for the crew of a single combat car are similarly executed in platoon drill.

(2) The platoon being formed in line, the combat cars are habitually numbered from left to right, 2, 1 (the base), 3. At the halt, all cars are on line with the base car. When moving, nos. 2 and 3 cars are echeloned on each side of the base car as hereinafter prescribed.

(3) The platoon being formed in column, the combat cars are habitually numbered from front to rear in the order 1, 2, 3.

(4) The car occupying the No. 1 position is habitually the base.

(5) The car commander of the base car is the platoon commander.

(6) The radio operator of the base car is the gunner.

c. To form the platoon dismounted.—Combat cars having been started and warmed up—

(1) The senior noncommissioned officer takes position 4 yards in front of the point where the right driving sprocket of the base combat car is to rest, faces it and commands: ***FALL IN,*** indicating the formation which he desires (habitually either line or column).

(2) The combat cars are brought into the indicated formation and crews dismounted at attention at their posts as prescribed for the individual car crew in paragraph 29*a*.

(3) The platoon being formed, dismounted, at the command ***Fall out,*** the crews break ranks, habitually falling out to the right of their respective cars.

(4) The combat cars being in formation, the crews having fallen out, at the command ***Stand to car,*** the crews resume their posts, dismounted, at attention.

(5) The platoon commander places himself 4 yards in front of and facing the senior noncommissioned officer, who, when the

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platoon is ready to move, reports, "Sir, the platoon is formed"; or, if it is not ready, reports the cause of delay.

(6) In forming the platoon, all who are required to make a report salute and maintain it until the report is acknowledged.

(7) To mount the platoon, the platoon commander commands or signals: ***MOUNT,*** and the crews mount as prescribed for the individual crew in paragraph 29*b*.

d. Mounted formations.—(1) The prescribed formations of the combat car platoon are line, column, and echelon. These formations may be taken in either close, normal, or extended order.

(*a*) *Distances in column.*—Close, 5 yards; normal, 15 yards; extended, as ordered.

(*b*) *Intervals in line.*—Close, 5 yards; normal, 15 yards; extended, as ordered.

(2) Halted in line, cars are on line with the base car at 5 yards interval, except that in extended order they halt in place.

(3) Moving in line, cars are echeloned on the base car, distances being measured as prescribed in paragraph 15*a*, intervals being measured from the trace of the base car.

(4) Halted in column, cars close to 5 yards distance, except that in extended order they halt in place.

(5) Moving in column, the correct distances as prescribed in (1) (*a*) above are resumed.

e. Preliminary training in formations and movements.—Before proceeding to mounted drill, the platoon crews will be given dismounted drill simulating the mounted drill. In this drill only the distances and intervals of close and normal orders will be used. The extended order will be explained, probable car positions being indicated on the terrain. The object of this drill is to accustom the car commanders and crews to all signals and the mechanism of the drill and to allow them to visualize the correct intervals and distances involved. Great care should be taken to stress the fact that the drill is a position drill, the positions being numbered and those numbers being applicable to the car only as long as the formation and the direction of march remain unchanged.

f. Normal order.—(1) *To form line from column.*—(*a*) The platoon being in motion in column, the signal ***Line*** (blue) is given from the base car. The base car continues the march,

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rate unchanged; No. 2 car increases the speed slightly and moves by the left oblique, resuming speed when at 15 yards interval from the trace of the base car, and its front on a line 15 yards (measured along the trace) from the rear of the base car. No. 3 car increases the speed smartly and moves by the right oblique to a position abreast of No. 2 car and at 15 yards interval from the trace of the base car.

(*b*) If the base car halts, the wing cars come up abreast of the base car closing to 5 yards interval.

(2) *To form column from line.*—(*a*) The platoon being in line, either in motion or at a halt, the signal ***Column*** (red) is given from the base car. The base car moves out, if halted, or continues the march if in motion. No. 2 car, at the proper time, proceeds by the right oblique so as to take its place in trace of the base car at 15 yards distance. No. 3 car, at the proper time, proceeds by the left oblique so as to take its place in trace of No. 2 car at 15 yards distance.

(*b*) If the base car halts, the cars following close to 5 yards distance.

(3) *To form echelon right (left).*—(*a*) The platoon being in line, the signal ***Echelon right (left)*** (blue, displayed to the right (left) horizontally) is given. The base car moves out, if halted, or continues the march if moving. No. 2 (3) car, at increased speed, continues to its front, passing the base car, and maintaining its interval from that car's projected course until its rear is 15 yards ahead of the front of the base car, measured along that car's projected course, at which point it resumes the normal rate of speed of the base car. No. 3 (2) car continues its rate of march in its normal position to the right (left) rear of the base car.

(*b*) To return to line (blue), No. 2 (3) car decreases its speed and drops into its normal position.

(*c*) The platoon being in column, the signal ***Echelon right (left)*** (blue, displayed as in (*a*) above is given. The base car moves out, if halted, or continues the march if moving. No. 2 car at increased speed proceeds by the left (right) oblique, passing the base car, and places itself 15 yards in advance of, and 15 yards in interval from, the projected course of the base car. No. 3 car slightly increases its speed and, moving by the

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right (left) oblique, places itself 15 yards in rear of, and at 15 yards interval from, the trace of the base car.

(*d*) To return to column (red), No. 2 car decreases its speed, allows the base car to pass, and by the shortest route drops into its correct place. No. 3 car increases its speed and by an oblique returns to its correct place in column.

(*e*) If the base car halts, all cars halt in place. (It is recommended that echelon be habitually formed from column, although exceptional circumstances may necessitate execution from line.)

(4) *To change direction 90° right (left).*—In any platoon formation, the platoon leader so maneuvers his base car as to lead his platoon through the desired change. No signal is necessary. An indication of the new direction is desirable. If in line or echelon, outside cars must increase their speed, inside cars slowing down.

(5) *To march by the right (left) flank.*—In any platoon formation, the signal ***By the right (left) flank*** (yellow, held vertically and lowered to the right (left) horizontal) is given. Each car individually turns 90° right (left) on its own ground and maintains its new relative position to the base car. This is for short movements only, and a flank movement should be straightened out by means of another flank movement into one of the original basic platoon formations.

(6) *To change direction 180°.*—(*a*) The platoon being in column, no signal is necessary. The platoon commander turns his car to the left about. Nos. 2 and 3 cars follow in trace, turning on the same ground as the base car.

(*b*) The platoon being in line, the signal ***To the rear*** (yellow, held vertically and lowered toward the rear to the horizontal) is given. Each car makes an individual 180° turn to the left about on a diameter of 15 yards, the flank cars slowing their speed to permit the base car to pass between them and resume its position of leadership in the new direction. (In the new direction the base car remains the same while the former No. 2 car has become No. 3 and the former No. 3 car now occupies the position of No. 2 car. Should column now be given, cars would take their places according to their new position numbers.) (See fig. 14.)

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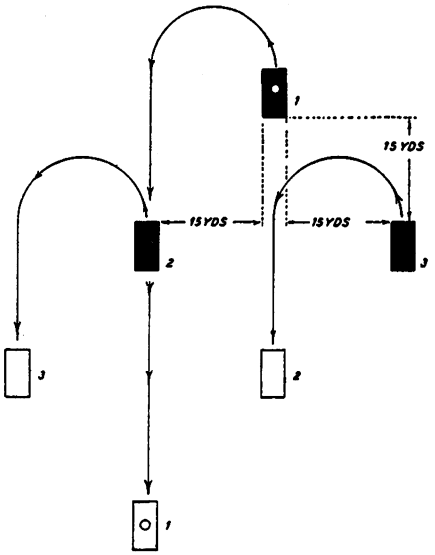

FIGURE 14.—Combat car platoon to the rear. (Note change of position numbers.)

(*c*) The platoon being in echelon, the signal ***To the rear*** (yellow, displayed as in (*b*) above) is given. Each car makes an individual 180° turn to the left about on a diameter of 15 yards and, guiding on the base car, resumes its march in the new direction. (In the new direction there is a reversal not only of positions but of the directon of echelon.)

g. Close order.—(1) Primarily, close order is for parades and ceremonies. It may be used in short periods for disciplinary drill. Great care must be taken in the execution of movements by the flank and to the rear and these movements should be executed only with the most experienced car commanders and drivers, and then only on favorable terrain free of obstacles.

(2) The principles are the same as those of the drill in normal order. Being in any normal order formation, at the signal ***Assemble*** (red and blue), all distances and intervals are reduced to 5 yards.

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(3) To return to the normal order, the signal ***Extend*** (white) is given. All distances and intervals are at once increased to 15 yards.

h. Extended order.—(1) Extended order is used for tactical training purposes and to develop the initiative and judgment of combat car commanders and drivers in the selection of individual routes over varied terrain toward a definite objective.

(2) The principles are the same as those of the drill in normal order. Being in any normal order formation, the signal ***Extend*** (white) is given. All distances and intervals are at once extended.

(3) All cars conform to the movements of the base car.

(4) If halted, cars execute the halt in place.

(5) To return to the normal order, the signal ***Assemble*** (blue and red) is given. All distances and intervals are at once decreased to 15 yards, the platoon habitually assembling in line, unless otherwise indicated.

i. To dismiss the platoon, mounted.—(1) The platoon being in any formation mounted, the command or signal ***Dismount*** is given.

(2) The crews dismount and ***stand to car*** at attention, the senior noncommissioned officer of the platoon taking his post 4 yards in front of the right driving sprocket of the base car. He faces the platoon and, when all crews are at their proper dismounted posts, executes an about face.

(3) The platoon commander directs the senior noncommissioned officer, "Dismiss the platoon," and falls out.

(4) Directions for servicing, cleaning, and garaging the cars and cutting the engines are then given and executed.

j. Formations, dismounted, without vehicles.—(1) The dismounted drills prescribed in CFM, volume I, are applicable in principle to the combat car platoon.

(2) Administrative reports, the inspection of arms, etc., should be accomplished prior to departure from barracks for the motor park.

31. The troop.—*a. Drill.*—The drills prescribed for a combat car platoon may also be executed as troop drill.

(1) The troop, being formed in line at the halt, the positions of platoons are as follows: Nos. 2, 1, and 3 from left to right in line, No. 4 placing itself directly in trace of and at 5 yards

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distance from No. 1. The base car of the platoon in position No. 1 follows, at the prescribed distances, in trace of the troop commander's car. At the halt, the base car of the platoon in position No. 1 closes on the troop commander's car to 5 yards distance. All cars of platoons in positions Nos. 2, 1, and 3 close to 5 yards interval and halt on line with base car of position No. 1. The base car of the platoon in position No. 4 closes to 5 yards distance on the base car of No. 1, other cars halting as prescribed for the platoon. When moving, the base car of platoon in position No. 1 follows the troop commander's car at the prescribed distances. Cars echelon within platoons and platoons in positions Nos. 2 and 3 echelon on the wing cars of platoon No. 1. Platoon No. 4 drops back to a position 50 yards in trace of platoon No. 1. The other vehicles of troop headquarters, when present, maneuver similarly to a platoon, in rear of platoon No. 4. (See fig. 15.)

(2) The troop being formed in column, the platoons are habitually numbered from front to rear in the order 1, 2 and 3, 4.

(3) The platoon occupying position No. 1 is habitually the base.

(4) The guide of the troop is habitually toward the base car of the base platoon.

b. To form the troop, dismounted.—Combat cars having been started and warmed up—

(1) The first sergeant takes position 4 yards in front of the point where the right driving sprocket of the troop commander's car is to rest and commands: ***FALL IN*** (or signals ***Assemble,*** blue and red), indicating the formation.

(2) The senior noncommissioned officer of each platoon places himself in the correct position for his platoon to form on him and commands: ***FALL IN.*** Each platoon then forms as prescribed in paragraph 30*c*.

(3) The senior noncommissioned officer of each platoon moves to a convenient point and reports to the first sergeant, "Sir, platoon No. —— is formed," and returns to his post.

(4) The first sergeant executes an about face and reports, "Sir, the troop is formed," and without command takes his post.

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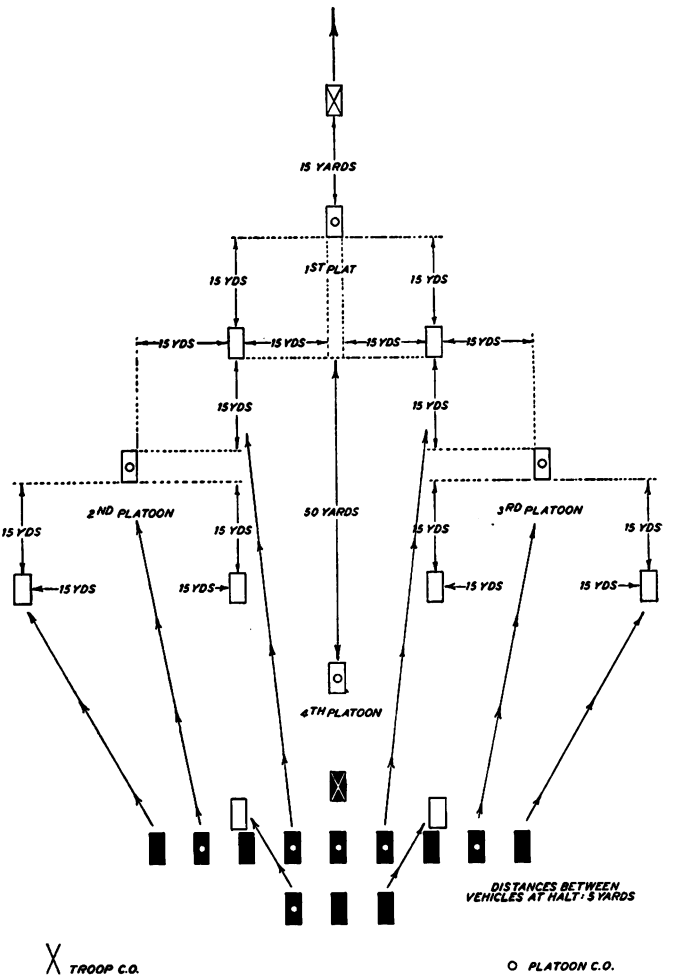

FIGURE 15.—Line halted to line moving (combat car troop).

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(5) The troop commander places himself 4 yards in front of and facing the first sergeant in time to receive his report.

(6) The platoon commanders, if officers, take their posts when the first sergeant has reported; if in line, 4 yards in front of their senior noncommissioned officer; if in column, 1 yard to the right of the right track of their command cars and on line with the crews thereof.

(7) The troop ***falls out, stands to car,*** and ***mounts,*** as prescribed for the platoon, on the command or signal of the troop commander.

(8) Motorcycles form ahead of the troop commander's position in charge of the senior designated motorcyclist. During road marches, tactical exercises, etc., they control traffic or remain in the vicinity of the troop commander.

c. Mounted formations.—(1) The prescribed mounted formations of the combat car troop are given below. These formations may be extended by displaying the white flag or closed by displaying the red and blue flags of assembly.

(*a*) *Line.*—Blue.

(*b*) *Column.*—Red.

(*c*) *Echelon.*—Blue (horizontal).

(*d*) *Line of platoon columns.*—White and blue.

(*e*) *Column of platoons.*—White and red.

(2) Distances and intervals are the same as prescribed for the platoon except that in extended order the desired interval is prescribed. In line, moving, base cars of platoons Nos. 2 and 3 are echeloned on the wing cars of platoon No. 1 at 15 yards distance and interval.

(3) Halted and moving in column, the distances are the same as those prescribed for the platoon.

d. Preliminary training in formations and movements.—The same general principles of preliminary training are applied to the troop as those prescribed for the platoon. Normal order is the habitual disciplinary drill formation mounted.

e. Normal order.—(1) *To form line from column.*—(*a*) The troop in column, the signal ***Line*** (blue) is given. The base platoon at once forms line. Platoon commanders of Nos. 2 and 3 conduct their platoons to the left and right oblique respectively and, when their base cars are in correct echelon in relation to the wing cars of No. 1, break their platoons into line.

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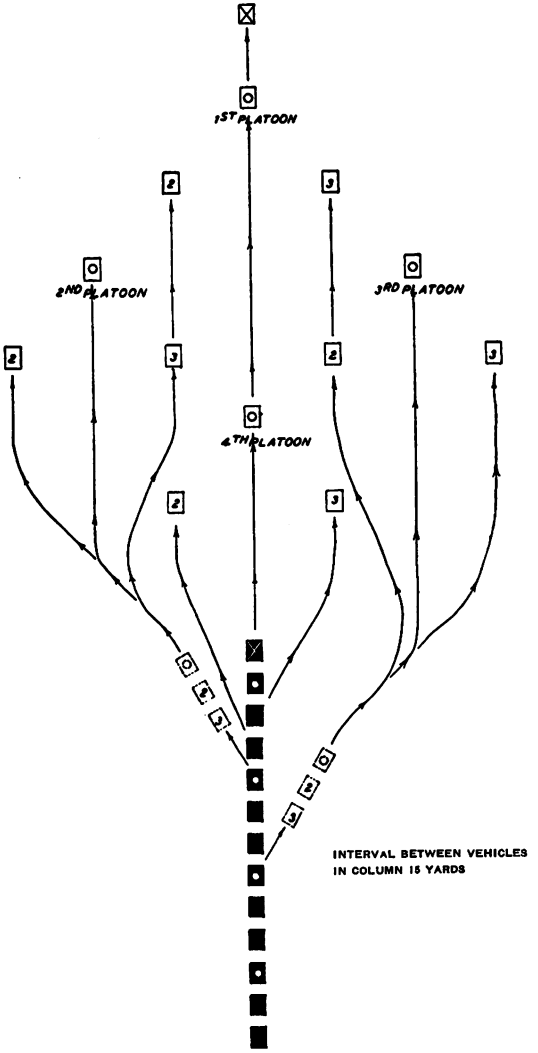

FIGURE 16.—Column to line moving (combat car troop).

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Platoon No. 4 at once forms line and so regulates his speed as to attain his position in trace of and at 50 yards distance from the base platoon. (See fig. 16.)

(*b*) If the troop is halted, cars close in interval and distance of 5 yards.

(2) *To form column from line.*—(*a*) The troop being in line, either in motion or at the halt, the signal ***Column*** (red) is given. The troop commander's car and the base car of platoon No. 2 move out if halted, or continue the march if in motion, the base platoon at once forming column. Platoon commanders of positions Nos. 2 and 3 break their platoons into column in time to lead them to their correct positions in the column. The commander of platoon No. 4 continues the march, if moving, breaking his platoon at once into column and so regulating his speed as to attain his proper place in rear of platoon No. 3. If halted, he remains at the halt while the other platoons are gaining their places, breaking his platoon into column in time to lead it to its correct position in rear of platoon No. 3.

(*b*) If troop is halted, cars close to 5 yards distance.

(3) *To form echelon right (left).*—(*a*) The troop being in line, the signal ***Echelon right (left)*** (blue displayed to the right (left) horizontally) is given. The command car, base platoon, and No. 3 (2) continue the march. The commander of No. 4 increases his speed and leads his platoon to position, echeloned, off the right (left) wing car of No. 3 (2). Platoon No. 2 (3) decreases its speed, the platoon commander leading it to the position formerly occupied by No. 4. (See fig. 17.)

(*b*) To return to ***line*** (blue), platoons Nos. 2 (3) and 4 increase and decrease their speeds respectively and are led to their normal positions.

(*c*) The troop being in column, the signal ***Echelon right (left)*** (blue displayed as in (*a*) above) is given. The command car, base platoon, and No. 4 continue the march. The commanders of Nos. 2 and 3 lead their platoons at increased speed, individually, to the right (left) oblique, No. 2 echeloning abreast of and 30 yards to the right (left) of the rear car of No. 1; No. 3 echeloning on No. 2 in similar manner. (See fig. 18.)

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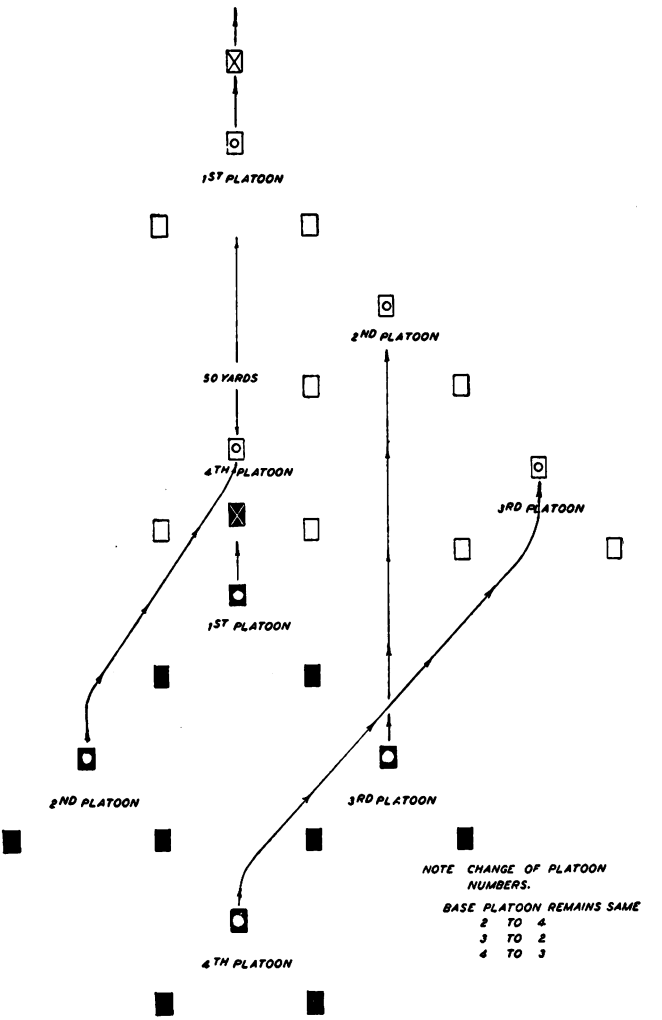

FIGURE 17.—Echelon right from line moving (combat car troop).

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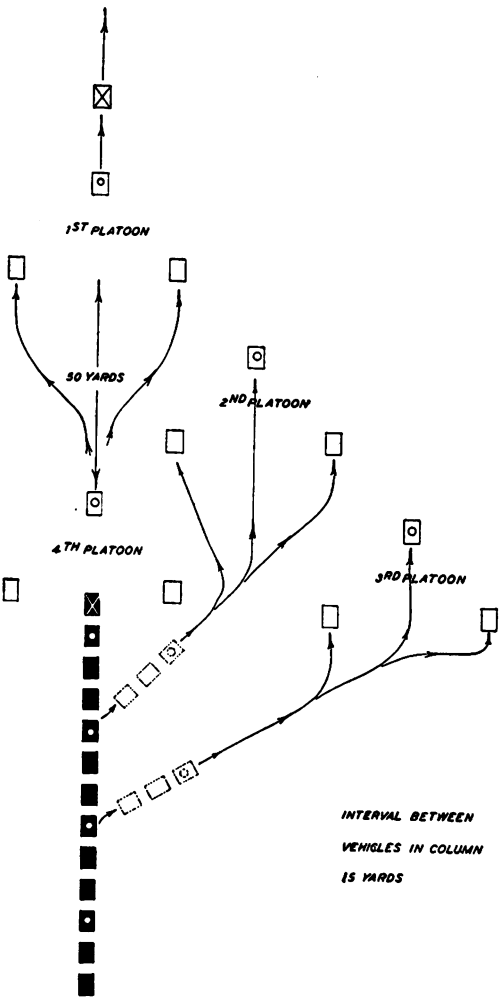

FIGURE 18.—Echelon from column (combat car troop). (No change of platoon numbers.)

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(*d*) To return to ***column*** (red), each platoon is placed in column and led by a left (right) oblique to its correct position in column.

(*e*) If the troop halts, all cars halt in place.

(*f*) Being in echelon or any extended formation, each platoon conforms to the movements and takes the formations of the base platoon.

(4) *To form line of platoon columns.*—(*a*) The troop being in line either in motion or at the halt, the signal ***Line of platoon columns*** (white and blue) is given. If halted, the troop moves forward, each platoon commander signals ***Column*** (red), and continuing the march of his car, breaks his platoon at once into column.

(*b*) Relative intervals and distances between platoon base cars are maintained.

(*c*) If the troop halts, platoon commanders lead their platoons to close to 5 yards interval (in the case of No. 4, distance) from the base platoon or No. 2.

(*d*) To return to ***line*** (blue), if moving, platoons immediately break into line. If halted, the troop moves forward, platoon commanders conducting their platoons to their correct positions and there breaking them into line.

(*e*) The troop being in column, either in motion or at the halt, the signal ***Line of platoon columns*** (white and blue) is given. If halted, the troop moves forward, the commander of platoon No. 2 to the left oblique and the commander of No. 3 to the right oblique, both with increased speed, leading their platoons to their correct positions, with proper echelon. The base platoon and No. 4 continue their march undisturbed.

(*f*) To return to ***column*** (red), if halted, the troop moves forward; if moving, the troop commander's car and base platoon continue the march and platoons Nos. 2 and 3 are led by the shortest route to their normal positions in column.

(5) *To form column of platoons.*—(*a*) The troop being in column either in motion or at the halt, the signal ***Column of platoons*** (white and red) is given. If halted, the troop moves forward. Each platoon commander without changing his speed continues his march in the trace of the troop command car and breaks his platoon into line.

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(*b*) If the troop halts, platoon commanders' cars close to 5 yards distance and the platoons halt on line.

(*c*) To return to ***column*** (red), each platoon commander signals ***Column*** and continues the march.

(*d*) The troop being in line either in motion or at the halt, the signal ***Column of platoons*** (white and red) is given. If halted, the troop moves forward, platoon commanders leading their platoons to their correct position in column, platoons remaining in line.

(*e*) To return to ***line*** (blue), each platoon commander leads his platoon to its normal position as heretofore prescribed.

(*f*) The troop being in line of platoon columns, either in motion or at the halt, the signal ***Column of platoons*** (white and red) is given. If halted, the troop moves forward, platoon commanders leading their platoons into an approximate column formation as prescribed in (3) (*d*) above, and as the column is approximated, breaks his platoon into ***line*** (blue), maintaining his proper distance.

(*g*) To return to ***line of platoon columns*** (white and blue), each platoon commander signals ***Column*** and leads his platoon to the positions prescribed in (4) (*e*) above.

(6) *To change direction of the troop 90° right (left).*— Being in any troop formation, the troop commander gives ***By the right (left) flank*** (yellow, held vertical, and lowered to the right (left) horizontal). At the same time the troop commander's car turns suddenly toward the new direction of march, indicating he is to select another base platoon, and then gives the command of execution. Each platoon commander leads his platoon through a change of 90° right (left). The troop commander's car takes position in front of the former platoon No. 3 (2) thus making it the No. 1 (4). Former No. 1 has now become No. 2 (3), former No. 4 has become No. 3 (2), and former No. 2 has become No. 4 (1). Further drill is continued as heretofore prescribed with the new position numbers. (See fig. 19.)

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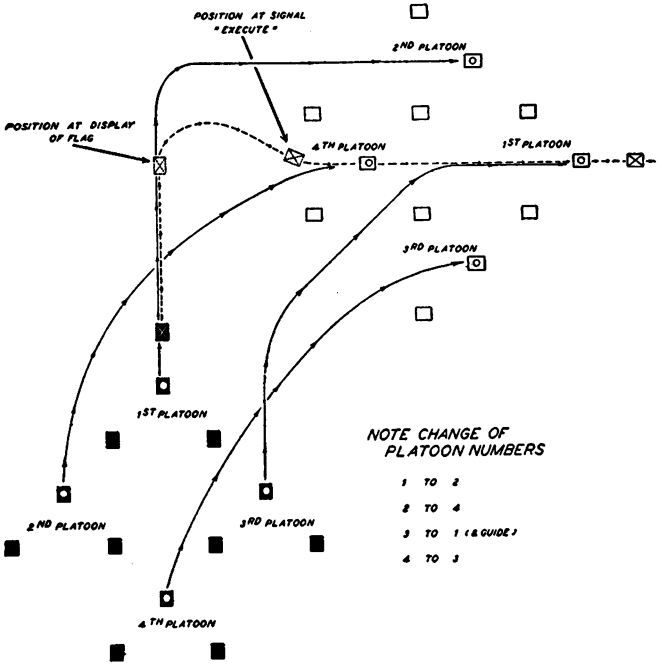

FIGURE 19.—To change direction 90° (combat car troop).

(7) *To march by the right (left) flank.*—(*a*) Being in any troop formation, the troop commander gives ***By the right (left) flank*** (yellow, displayed as in (6) above), and continues the march. At the command of execution, each car individually does a 90° change of direction to the right (left).

(*b*) Prior to any further signals being given, the troop should be marched to its original front by another flank signal.

(8) *To change direction of the troop 180°.*—(*a*) The troop being in column, the signal ***To the rear*** (yellow, held vertical and lowered toward the rear to the horizontal) is given. At the same time the troop commander's car turns suddenly to the right about (the troop continuing its march) and when opposite the middle of the troop the command of execution is given.

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Each platoon commander leads his platoon to the left about on a half circle of diameter of 15 yards. The column, re-forming, and the troop commander's car having gained its lead, moves off in the new direction. Position numbers have been reversed, the former platoon No. 4 becoming No. 1 and the base. Further drill is continued as heretofore prescribed with the new position numbers. (See fig. 20.)

(*b*) The troop being in line, the signal ***To the rear*** (yellow, displayed as in (*a*) above) is given. At the same time the troop commander's car turns suddenly to the left about, passing outside the flank car of the base platoon (the troop continuing its march) and when between platoons Nos. 2 and 3, the command of execution is given. Each platoon does a separate ***To the rear,*** as prescribed in paragraph 30 *f* (6) (*b*).

The troop commander's car having gained its new position in front of the former No. 4, now No. 1 and base, the troop moves off in its new direction. Other position numbers have been changed, former No. 3 to No. 2, former No. 1 to No. 4. Further drill is continued with the new position numbers.

(*c*) The troop being in column of platoons, the signal ***To the rear*** (described above) is given. At the same time the troop commander's car turns suddenly to the right about (the troop continuing its march) and when opposite the rear of platoon No. 2, the command of execution is given. Each platoon does a separate ***To the rear.*** The troop commander's car having gained its new position at the head of the column, drill is continued with reversed position numbers.

(*d*) The troop being in line of platoon columns, the signal ***To the rear*** (described above) is given. At the same time the troop command car turns suddenly to the left about (the troop continuing its march) and when between platoons Nos. 2 and 3 the command of execution is given. Each platoon does a separate ***To the rear,*** as prescribed in paragraph 30 *f* (6) (*b*). The troop commander's car having gained its new position in front of the new base, drill is continued with changed position numbers.

32. The squadron.—*a. Organization.*—The squadron is normally commanded by a major, assisted by such commissioned and enlisted personnel as is provided in Tables of Organization.

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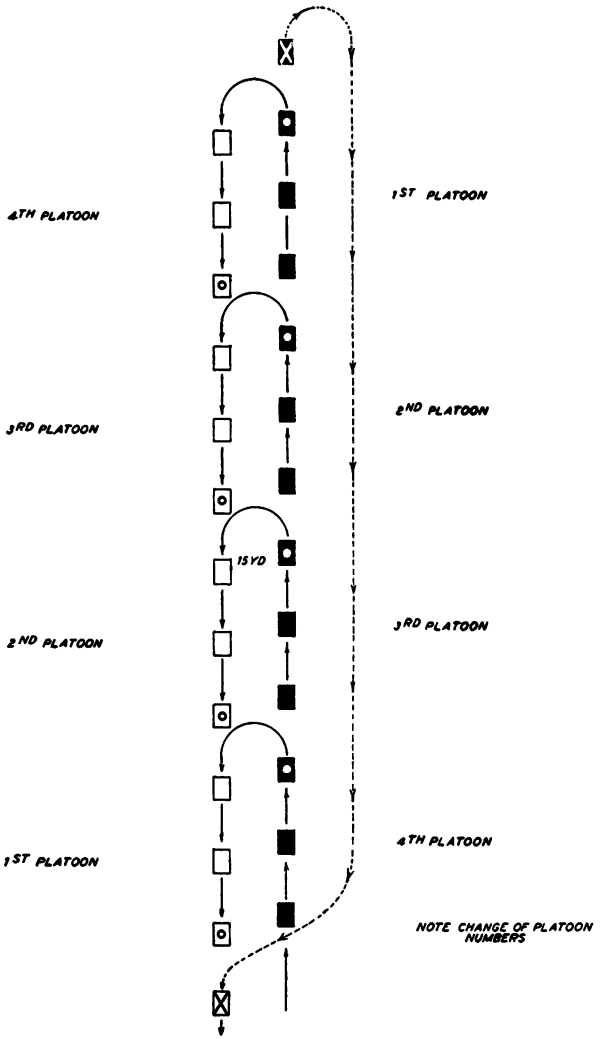

FIGURE 20.—To the rear (troop in column) (combat car troop).

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b. Duties of commander.—The squadron commander is responsible for the theoretical and practical training of the squadron. He supervises the preparation of programs and schedules of training and the conduct of instruction by troops with a view to securing thoroughness and uniformity. In the instruction of the squadron as a whole, his efforts will be directed chiefly to the development of tactical efficiency, devoting only such time to the mechanism of the drill and to ceremonies as may be necessary to insure precision, smartness, and proper control.

c. Drill and movements.—(1) All movements of the squadron will be governed by the general principles of mechanized drill. The combat car squadron may be drilled by means of the drills prescribed for the combat car troop. Squadron drill will not be frequent on account of the amount of terrain required.

(2) The normal drill formation for assembly of the squadron is line of platoon columns.

(3) (*a*) The squadron commander leads and directs the movements of the squadron from his command car by flag signals or radio supplemented by motorcycle messenger, leaving intervals and distances to the discretion of his troop commanders as may be demanded by the nature of the terrain and the exigencies of the situation. Intervals and distances within troops and smaller units remain as heretofore prescribed.

(*b*) Mounted drill of the mechanized squadron will ordinarily be limited to such movements into basic formations, close and extended order, as can be clearly indicated by flag or arm signals or example of the leader. (See *d* (1) below.)

(4) When the special formations listed in *d* (2) below are required, orders for same must be given by radio or messenger.

(5) A squadron in any line formation habitually forms into any column by breaking to the direction of march from its base troop in line. The base troop is indicated by the squadron commander, who has his command car take post in front of the command car of the troop. Normally the right troop is the base.

(6) The squadron, to form any column formation from any line formation, habitually forms by elements as prescribed for the troop, commencing with the base element of the base troop.

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(7) A squadron in column of any kind habitually forms any line formation by a fan-shaped deployment. The second troop in column moves up on the left of the base or leading troop. When the line is to be formed facing a direction other than the direction of march, the head of the column is turned in the new direction before deployment is ordered. In extended order formations, the dispersion makes the unit unwieldy and movements are lengthy in time of execution. Motorcycle messengers or radio may be resorted to for the purpose of transmitting orders. Flags, except under exceptional circumstances, are not useful. Preliminary planning is of the greatest importance and a thorough knowledge of the drill of smaller units is essential.

(8) Distance and interval between troops in close order drill are the same as prescribed for platoons in the troop.

(9) The base platoon of the leading troop is the guide.

(10) The two squadron motorcycles precede the squadron on the march for its protection and traffic control. At ceremonies and inspections, when halted, they are posted in line with and on the left of the squadron commander's car.

d. Formations.—(1) *Mounted.*—The squadron executes all formations prescribed for the troop and in which the basic principles of troop drill apply.

(*a*) *Column.*—Column is a formation in which one troop is behind the other, each in column of single vehicles. (See fig. 21.)

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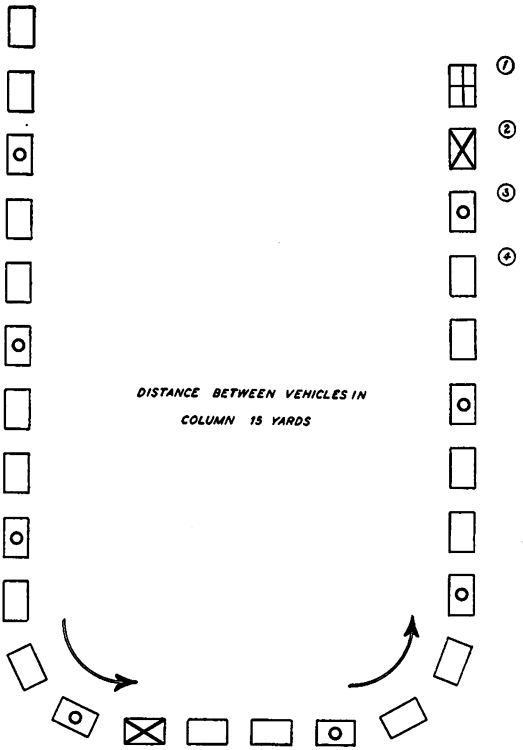

FIGURE 21.—Combat car squadron in column.

1. Squadron commander's car.
2. Troop commander's car.
3. Platoon commander's car.
4. Combat car.

(*b*) *Column of platoons.*—This is a formation in which one troop is behind the other, each in column of platoons. (See fig. 22.)

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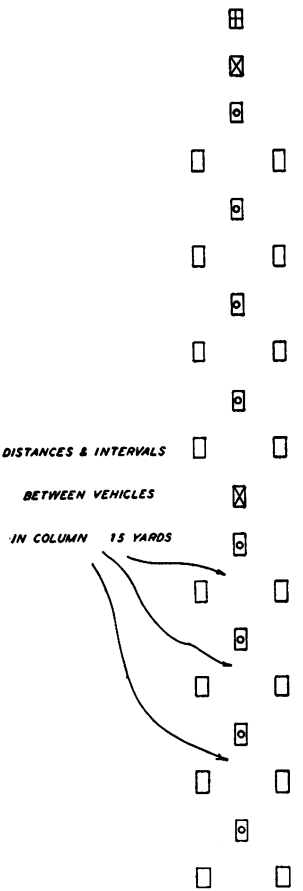

FIGURE 22.—Combat car squadron in column of platoons.

(*c*) *Line.*—Line is a formation in which the troops are in line and abreast of each other. In each troop the platoons are echeloned on the base platoon except at the halt. (See figs. 23 and 24.)

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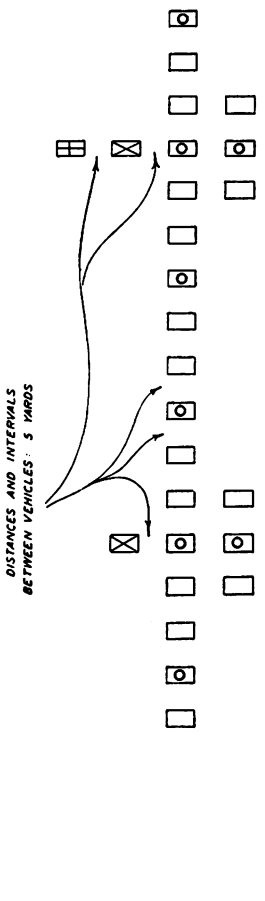

FIGURE 23.—Combat car squadron in line, halted.

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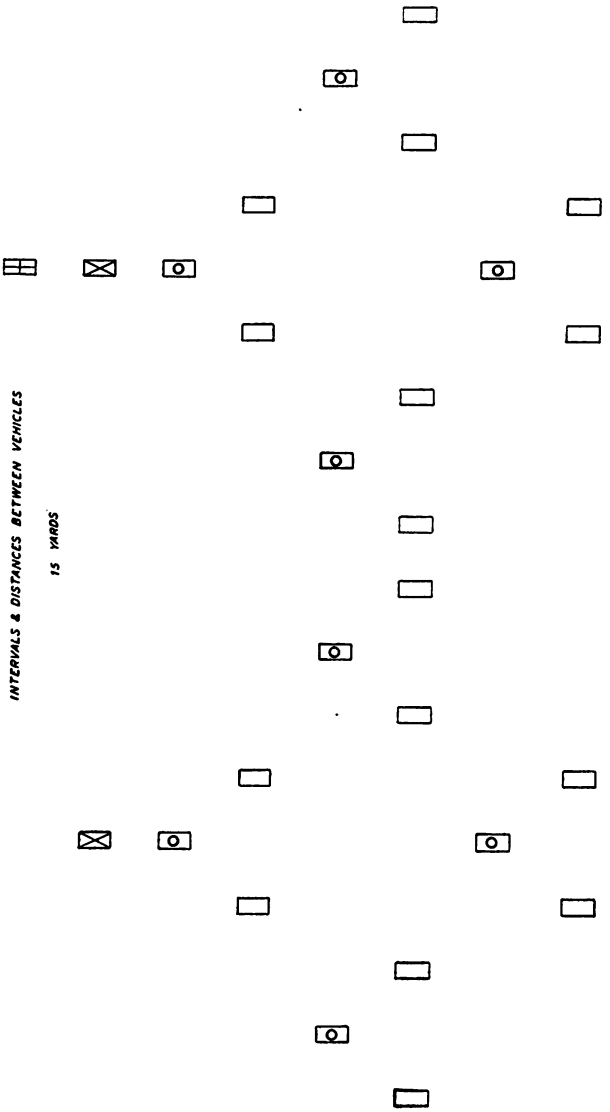

FIGURE 24.—Combat car squadron in line, moving.

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(*d*) *Line of platoon columns.*—This is a formation in which the troops in line of platoon columns are abreast of each other. Platoons are echeloned on the base as in (*c*) above. (See fig. 25.)

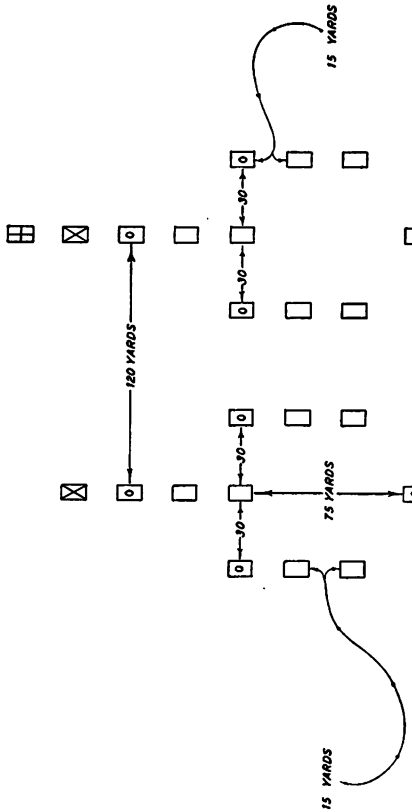

FIGURE 25.—Combat car squadron in line of platoon columns.

(*e*) *Line of troop columns.*—This is a formation in which the troops in column of vehicles are abreast of each other. (See fig. 26.)

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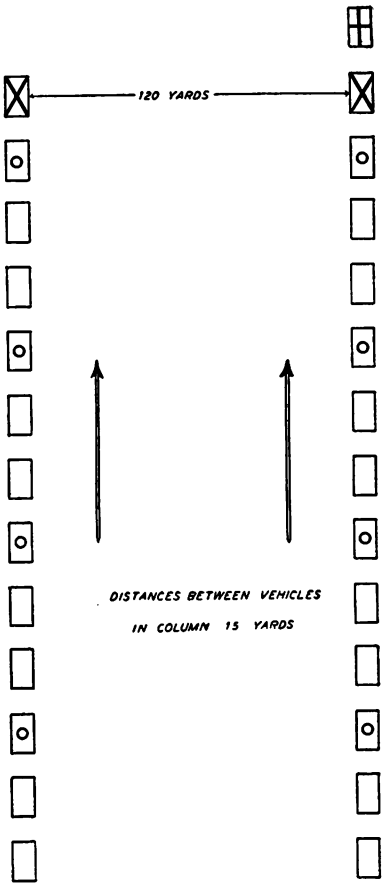

FIGURE 26.—Combat car squadron in line of troop columns.

(2) *Special.*—For tactical and other purposes, the following formations are effective:

(*a*) *Line of troops, column of platoons.*—This is a formation in which the troops, in column of platoons, are abreast of each other.

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(b) Column of troops; troops with two platoons in the front line and two in support.

(c) Column of troops; troops in line. (See fig. 27.)

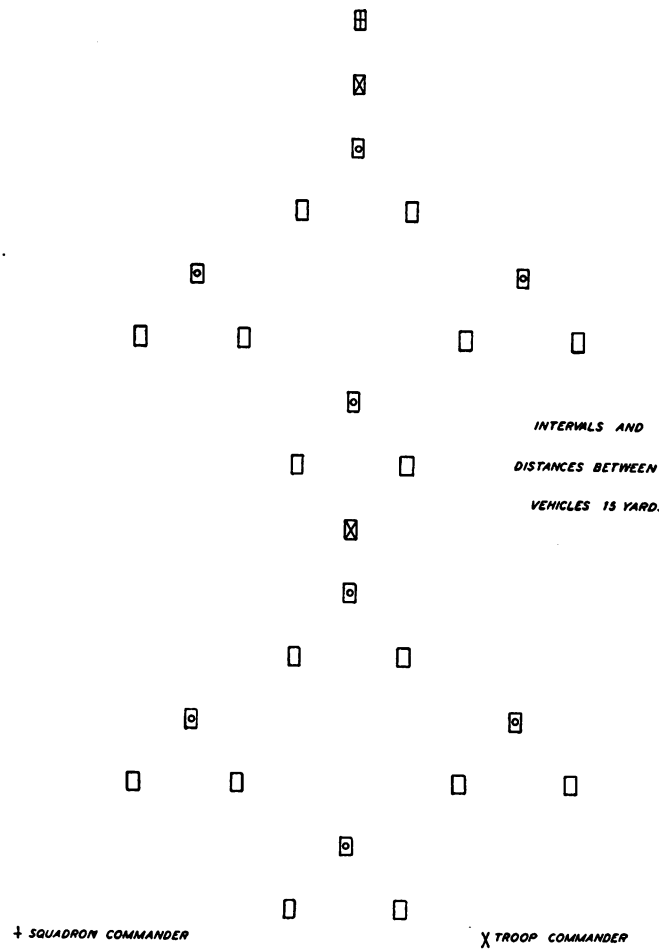

FIGURE 27.—Combat car squadron in column of troops, moving.

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(*d*) *Echelon.*—Echelon is a formation in which one troop is less advanced than the other and is unmasked by the troop in front.

e. To form the squadron.—(1) The squadron adjutant informs the troop commanders of the place of assembly and the formation to be taken. The squadron commander's car is posted in front of the desired location of the command car of the base troop, faced to the front.

(2) Troops assemble, taking position habitually in the order of their letter designations from right to left in line or from head to rear in column.

(3) When troops are in place, the adjutant reports to the squadron commander, "Sir, the squadron is formed."

(4) If the squadron commander is dismounted, troops will be dismounted from their vehicles before the squadron is reported formed.

f. To dismiss the squadron.—The squadron commander commands: ***DISMISS YOUR TROOPS.*** Troop commanders conduct their troops to the proper places and dismiss them.

Section IV

MACHINE-GUN TROOP

33. Drill.—The machine-gun troop is organized to fight on foot; therefore its drill includes both mounted and dismounted formations and maneuvers. Dismounted movements are limited to short distances, pertain to combat, and conform to the principles of elementary and advanced gun drill prescribed for horse cavalry units in CFM, volume I. For mechanical training, marksmanship, and technique of fire, see BFM, volume III.

a. Mounted.—Mounted drill includes the formations and maneuvers of vehicles and also the execution of the necessary duties of personnel to carry on mounted combat.

b. Dismounted.—When the troop dismounts to fight on foot, personnel carriers are maneuvered and disposed by the first sergeant. When at a halt, vehicle guns are manned by drivers.

c. Speeds, intervals, and distances.—Speeds are usually from 10 to 25 miles per hour. Intervals and distances conform to those prescribed for the other troops of the regiment. Platoons are invariably led by the platoon leader.

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FIGURE 28.—Machine-gun troop.

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34. Machine-gun squad.—*a. Organization.*—The machine-gun squad consists of a corporal, a driver, two gunners, two assistant gunners, and one ammunition carrier.

b. Dismounted movements.—All dismounted movements described are carried out at a double time. Dismounted movements not described conform to elementary gun drill.

c. To take dismounted posts.—The commands are: 1. ***Dismounted posts,*** 2. ***FALL IN.*** The squad forms at attention in column of twos, 1 yard in rear of and facing toward the personnel carrier. (See fig. 29.)

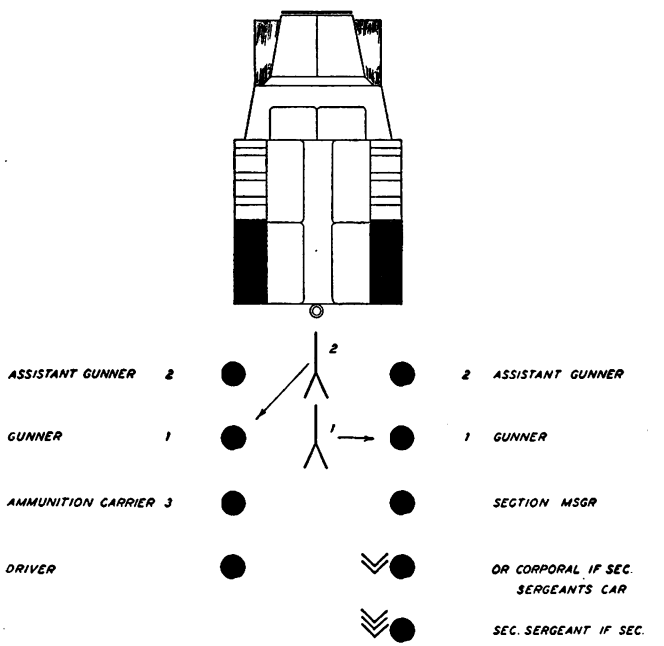

FIGURE 29.—Dismounted posts.

d. To mount the car squad with caliber .30 machine gun.—The command is: ***MOUNT.*** The driver passes around to the left of the vehicle and takes position on the driver's seat.

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The squad leader (or section leader, if a section leader's car) passes around the vehicle to the right and takes position on right of front seat beside the driver. No. 2 of the No. 2 gun crew opens the door and mounts; No. 1 of No. 2 gun passes the gun to his No. 2 and then mounts. No. 2 of No. 1 gun next mounts and receives the No. 1 gun from his No. 1, seating himself on the right side of the vehicle. No. 1 of the No. 1 gun crew then mounts and seats himself on the right side of the vehicle. No. 3 of the squad next mounts and seats himself on the left rear side. The squad leader (if a section leader's car) or section messenger next mounts and seats himself on the right rear side of the vehicle. The squad leader or section messenger is the last to mount. When all are seated with the door closed, they resume the position of attention, sitting erect with both feet on the floor, head and eyes directed to their front, and arms hanging naturally at the sides. If caliber .30 machine guns are not carried, the car squad would fall in and mount in the same order as prescribed above. (See fig. 30.)

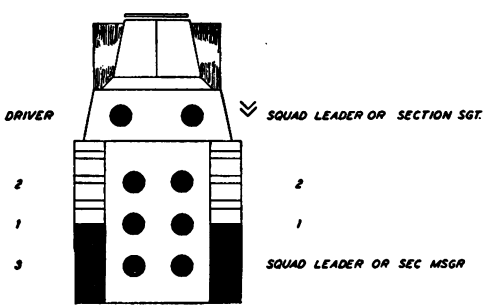

FIGURE 30.—Mounted posts.

e. To mount the car squad with caliber .50 machine gun.—At the command ***Mount,*** the squad proceeds as follows: The driver and squad or section leader mount on the front seat as heretofore described. No. 2 of No. 2 caliber .50 gun crew mounts first, followed by the other No. 2 of the squad. The two No. 1's dismount the caliber .50 barrel and receiver from the tripod, pass it to the two No. 2's, who secure it under the right seat on brackets provided. The no. 1's next pass the caliber .50 tripod,

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folded, to the No. 2's, who secure it under the left seat on brackets provided. No. 1 of No. 2 caliber .30 gun crew next mounts, followed by the other No. 1. No. 3 and squad leader or section messenger then mount in their normal order. The car squad is then seated in the same order as described in *d* above.

f. To dismount the car squad without machine guns.—The command is: ***DISMOUNT.*** The squad leader or section messenger opens the door and dismounts first, taking position as shown in figure 29. All other persons then dismount in reverse of the order in which they entered.

g. To go into action.—The command is: ***ACTION FRONT (REAR) (RIGHT) (LEFT).*** Unless otherwise ordered, the squad goes into action with its caliber .30 guns. The squad, except the driver, dismounts in reverse of the order in which it entered. The squad leader runs to the position where it is desired to place the guns and stands facing the target with arms extended to indicate the line upon which the guns are to be placed. The guns are then mounted in the desired position, the No. 1 gun on the right of the squad leader and the No. 2 gun on his left. Drivers of carriers then take carriers to cover in charge of the driver of the platoon commander's car. In formal drills each carrier is posted 50 yards in rear of center of interval between the two guns of the squad, facing the firing line. When the squad acts alone, its carrier is posted by the driver. When the squad dismounts from the carrier, No. 1 habitually carries the gun mounted on the tripod. In proceeding from the carrier to the firing line indicated by the squad leader, the squad may proceed in a squad column or a line of half squad columns, depending upon the terrain or as ordered by the squad leader. Normally it proceeds to the firing line in half squad columns. (See fig. 31.)

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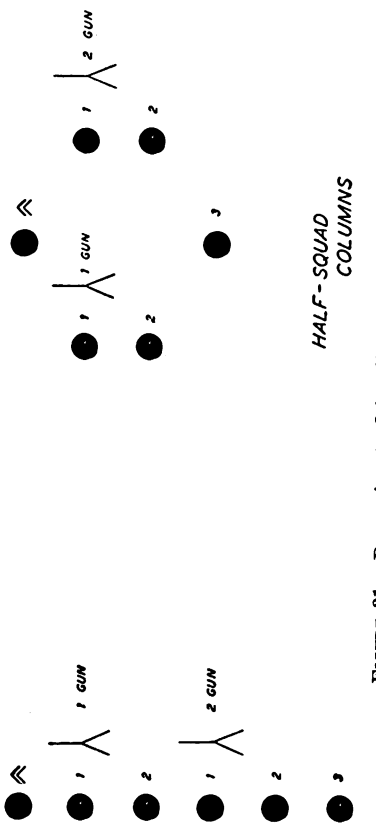

FIGURE 31.—Procession to firing line.

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h. To go into action with the caliber .50 machine gun.—The command is: ***ACTION FRONT (REAR) (RIGHT) (LEFT) CALIBER .50 MACHINE GUN.*** The driver remains mounted. The squad leader dismounts and takes position in rear of car as shown in figure 32. No. 3 takes his habitual position. The No. 1's of guns Nos. 1 and 2 dismount in that order. The No. 2's unstrap the caliber .50 barrel and receiver from its bracket and pass it to the No. 1's. The No. 2's then unstrap the tripod. No. 2 of gun No. 1 crew then dismounts and the other No. 2 passes the tripod to him and then dismounts. (See fig. 32.) In pro-

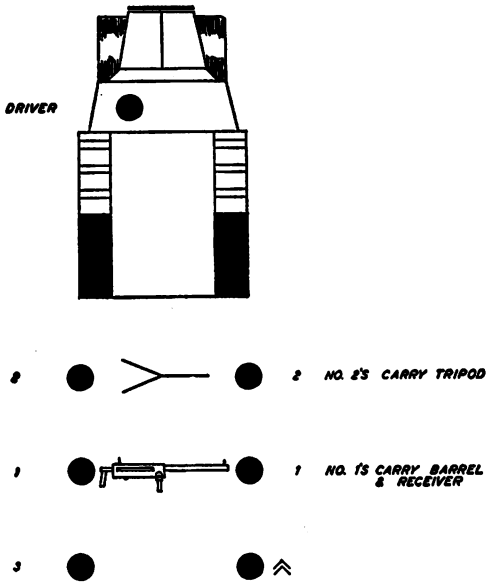

FIGURE 32.—Squad going into action with caliber .50 machine gun.

ceeding from the carrier to the firing line indicated by the squad or section leader, the squad leader leads the squad in a squad column as shown in figure 33. Upon arrival at the firing line, the No. 2's place the tripod on the indicated place. The No. 1's then mount the gun. No. 1 of gun No. 1 crew becomes the gunner and No. 1 of gun No. 2 crew his assistant. The No. 2's drop

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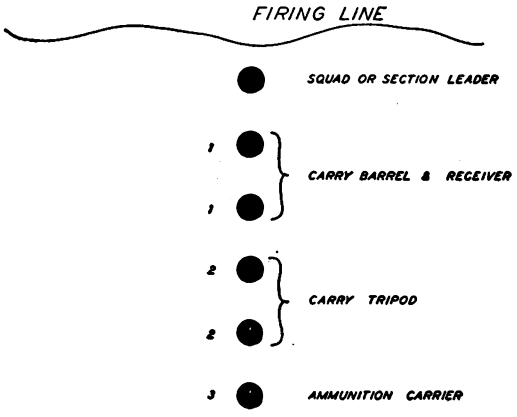
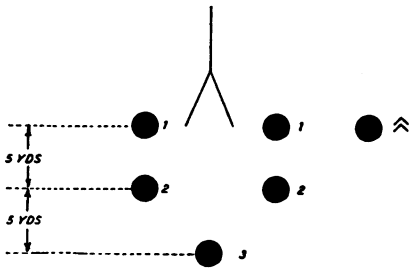
back 5 yards and assist in the ammunition supply. No. 3 falls in 5 paces in rear of the No. 2's. The driver of the carrier executes the same movements as described in *g* above. (See fig. 33.)



① Proceeding to firing line.



② Position at firing line.

FIGURE 33.—Caliber .50 machine-gun squad at firing line.

i. To go out of action.—(1) If it is desired to have the carriers come up to the firing line, the command is: 1. ***Out of action,*** 2. ***MOUNT.*** The squad then mounts with either its caliber .30 or caliber .50 guns as described in *d* and *e* above.

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(2) If it is desired to go out of action and march to the carriers, the command is: 1. ***Out of action,*** 2. ***MARCH ORDER.*** The squad falls in with its equipment as shown in *g* and *h* above, depending upon whether or not caliber .30 or caliber .50 guns have been employed. It is then led by the squad leader to its carriers, where it mounts.

j. To prepare for mounted action.—The command is: ***MOUNTED ACTION.*** The No. 1's unload the guns from their racks or tripods. The No. 2's release the spring pin and raise the side cradle mounts to their positions and then clamp pins. The No. 1's then mount their guns. The No. 2's place ammunition boxes in slots, raise lids, and insert brass tags into feedways preparatory to loading. The No. 1's then place themselves in firing position in rear of guns and load. When No. 1's take their positions, all other personnel so dispose themselves in the carrier as to give No. 1's freedom of movement. All remain in the alert position until the squad leader or car commander gives the necessary fire order. During mounted action the cowl gun is also alerted but is only fired directly to the front when necessary or against hostile aircraft. The side mounts are only employed for fire to the right and left or directly to the rear. These limitations of directions are necessary in order to insure the safety of the squad.

k. To go out of mounted action.—The command is: ***OUT OF ACTION.*** Guns are unloaded, placed in carrying ranks or on tripods, and equipment put in its proper place.

35. Rifle squad.—*a. Movements.*—(1) The rifle squad is a part of the rifle platoon but its movements are taken up in this section because of the similarity of control and movements to those of the machine-gun squad. It consists of one corporal, one driver, and five riflemen.

(2) All dismounted movements or drill not described herein conform to those of the cavalry rifle squad, dismounted.

b. To take dismounted posts.—The command is: 1. ***Dismounted posts,*** 2. ***FALL IN.*** The squad forms at attention in column of twos, 1 yard in rear of the carrier as shown in figure 34.

c. To mount the car squad.—The command is: ***MOUNT.*** The driver passes around to the left of the vehicle and takes his position at the wheel. The squad leader or section sergeant

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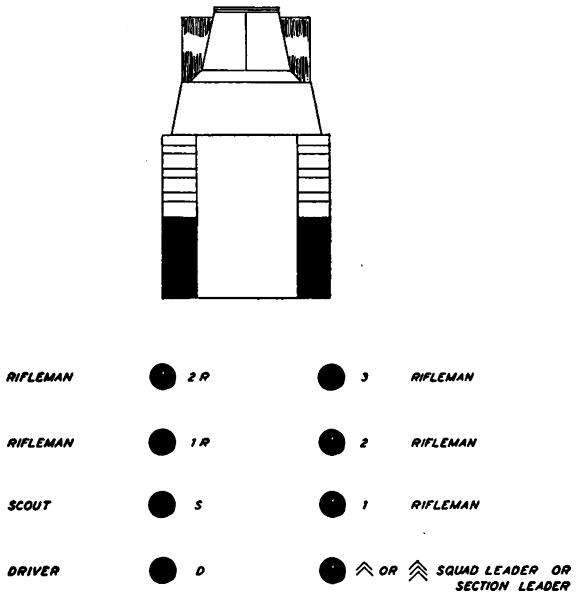

FIGURE 34.—Dismounted posts (calvary rifle squad).

passes around the right of the vehicle and takes position on right of front seat beside the driver. The riflemen then mount up alternately from right and left and seat themselves as shown in figure 35.

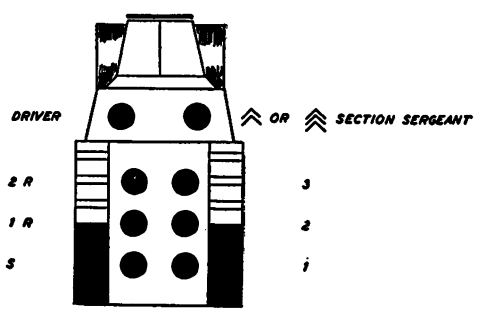

FIGURE 35.—Mounted posts (cavalry rifle squad).

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d. To dismount the car squad.—At the command ***Dismount,*** the entire squad dismounts in reverse of the order described in *c* above.

e. To go into action.—The command is: ***ACTION FRONT (REAR) (RIGHT) (LEFT).*** The squad, except the driver, dismounts as prescribed above. The squad leader then leads his squad to the desired position on the firing line by methods as prescribed for the cavalry rifle squad. Drivers of carriers take carriers to cover in charge of the platoon commander's car driver. In formal drills, each carrier is posted 50 yards in rear of center of the squad. When the squad acts alone, its carrier is posted by the driver.

f. To go out of action.—The procedure is the same as that prescribed for the cavalry rifle squad.

g. To prepare for mounted action.—The command is: ***MOUNTED ACTION.*** Normally the rifle platoon is not equipped with caliber .30 machine guns, hence only car commanders employ the cowl mounts. These are put into action in the same manner as those of the machine-gun platoons.

36. Machine-gun section.—*a. Organization.*—The machine-gun section consists of section headquarters, comprising the section sergeant and his messenger and two machine-gun squads. The section sergeant rides in the car of the first squad of the section and the messenger rides in the right rear of the second car.

b. Commands.—The commands to fall in, mount, dismount, go into action, mounted action, or withdraw from action or mounted action are received from the platoon commander, if the section is acting with its platoon, and conveyed to the squad leaders by the section sergeant. If the section is acting alone, the section sergeant gives his own orders as necessary.

c. Mounted formations.—The section follows mounted formations as ordered by the platoon commander when it is acting with its platoon. When acting alone, the section sergeant gives such commands as are necessary to get the section to the place desired. The section can execute ***line*** or ***column.***

37. Rifle section.—*a.* The rifle section consists of section headquarters, a sergeant, one scout, and two rifle squads. The section sergeants and scouts ride in the same place as described in paragraph 36*a*.

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b. The commands to fall in, etc., are carried out in the same manner as prescribed in paragraph 36*b*. After leaving the carriers, the rifle section sergeant handles his section in the same manner as prescribed for the cavalry rifle platoon.

c. The rifle section performs in the same manner as that prescribed for the machine-gun section in paragraph 36*c*.

38. Machine-gun platoon.—*a. Organization.*—The machine-gun platoon consists of platoon headquarters and two sections of two squads each. The platoon headquarters normally consists of one lieutenant, one platoon sergeant, one driver of the platoon commander's car, and one platoon messenger. A radio operator is attached from the regimental headquarters troop. A motorcyclist is usually attached from the troop headquarters when the platoon is detached from the troop.

b. Commands.—The commands to fall in, etc., are received from the troop commander and the sequence of command follows the same general order as prescribed in paragraph 36*b*.

c. Mounted formations.—The machine-gun platoon conforms to formations as ordered by the troop commander. Line or column is invariably used with the platoon leader leading. When the platoon is in action, the empty personnel carriers are disposed for both ground and air defense and to facilitate the supply of ammunition. When so disposed, drivers man the vehicle guns. (See figs. 36, 37, and 38.)

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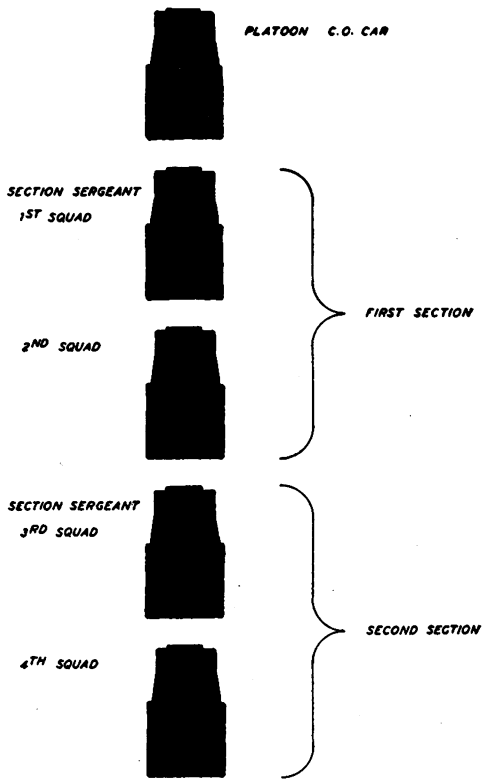

FIGURE 36.—Machine-gun platoon in column.

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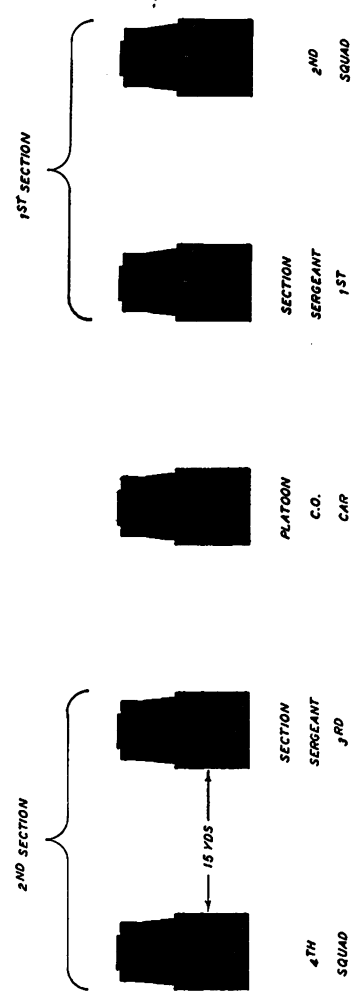

FIGURE 37.—Machine-gun platoon in line formation.

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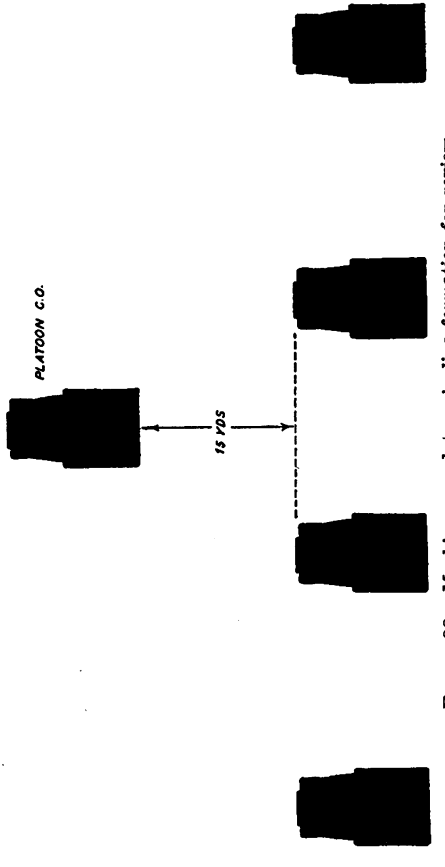

FIGURE 38.—Machine-gun platoon in line formation for review.

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39. Rifle platoon.—*a.* This platoon consists of platoon headquarters (one lieutenant, one platoon sergeant, one driver of the platoon commander's car, one platoon messenger mounted on a motorcycle), and two sections of two squads each. A radio operator is attached from regimental headquarters troop.

b. The rifle platoon conforms to the same mounted formations as prescribed in paragraph 38*c*.

c. In the tactical handling of the platoon, the same principles and formations apply as for the cavalry rifle platoon.

40. The troop.—*a. Organization.*—The machine-gun troop consists of troop headquarters, three machine-gun platoons, and a rifle platoon. The vehicles of troop headquarters are maneuvered as a platoon whenever they are present. They are posted on the left in line and in rear in column.

b. Formations.—(1) The following are the formations used by the machine-gun troop:

(*a*) Line.

(*b*) Column.

(*c*) Line of platoon columns.

(*d*) Column of platoons.

(2) Intervals, distances, and signals conform to those normally prescribed for the other troops of the regiment. When the troop is in dismounted formation in front of vehicles, the normal formation is double rank line. When the troop is in dismounted action, the empty personnel carriers of platoons are grouped separately.

SECTION V

MORTAR PLATOON

41. Training of personnel.—*a.* All enlisted men assigned to the mortar platoon will be given individual instruction.

b. Dismounted drill and mounted drill for this platoon are similar to those for platoons of combat car troops.

c. The mortar drill outlined is applicable to 4.2-inch mortar transported on 4.2-inch mortar carriage, T–5.

42. Technique of mortar fire.—Instruction in the technique of 4.2-inch mortar fire, insofar as practicable, will conform to the methods prescribed by Basic Field Manual. In the appli-

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cation of these methods, many expedients may be employed to increase the rapidity of going into and out of action. The accuracy required of mortars in the projection of high explosives and certain chemicals is not required of mortars when the primary mission is the projection of smoke material. This permits dispensing with refinements considered essential in the laying of mortars when accuracy is the prime consideration.

43. The squad.—*a. Organization.*—(1) The mortar squad consists of one corporal and three privates. The corporal commands the squad and directs the service of the mortar. No. 1 is the gunner, No. 2 is the first shell man, No. 3 is the second shell man and driver of the mortar carriage.

(2) The transportation of the mortar squad consists of one 4.2-inch mortar carriage, T–5, on which the mortar is mounted and which transports the squad. Ammunition compartments on this vehicle carry 46 rounds of shell.

(3) All members of the squad are trained as mortar carriage drivers and gunners.

b. To form the squad.—(1) The squad leader, after indicating the position of the mortar, places himself opposite to and 3 yards in front of the right front wheel of the vehicle and commands: 1. ***Dismounted posts,*** 2. ***MARCH.*** At this command, members of the squad post themselves as shown in figure 39.

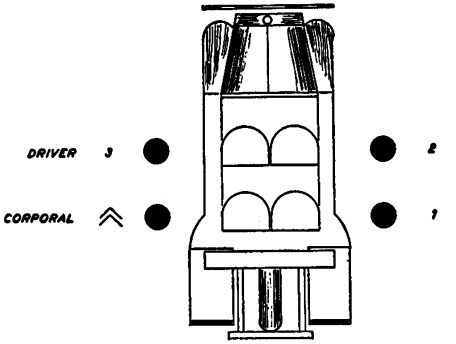

FIGURE 39.—Mortar squad dismounted.

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(2) The squad may be formed in front of the vehicle by the command: 1. ***One (two) yards in front of vehicle,*** 2. ***FALL IN.*** At this command, Nos. 1, 2, and 3 place themselves in front of the vehicle in the order named, No. 1 on the right.

(3) The men fall in at attention. Interval and alinement are as established in dismounted drill, CFM, volume I. When the squad has fallen in, the squad leader commands: ***COUNT OFF.*** The command is executed as in dismounted drill except that the corporal when in rank calls, "Corporal." When the squad is part of the section or platoon, the corporal, after interval and alinement have been established, places himself in the first instance opposite his place in the vehicle and in the second instance on the right of No. 1. In case a fifth man is assigned to a vehicle for transportation, he takes post behind No. 1 in the first instance and on the left of No. 3 in the second.

c. Mounted posts.—At the command 1. ***Prepare to mount,*** 2. ***MOUNT,*** given by the corporal, members of the mortar squad take posts seated at attention in the vehicle, No. 2 in front, the corporal and No. 1 in the rear; the corporal takes his seat in rear of the driver. (See fig. 40.)

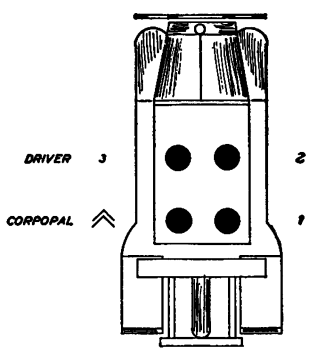

FIGURE 40.—Mortar squad mounted.

d. Mounted drill.—With the squad mounted, drill conforms to that prescribed for other single vehicles. The mortar corporal, from his post in the rear seat, will give the necessary commands to start, stop, turn, back, move on a point, and increase or decrease the rate of march. Mounted drill by the single vehicle

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of the squad will be used mainly for driving instruction of personnel.

44. The section.—*a. Organization.*—The mortar section consists of a sergeant who is section chief, one messenger, and three mortar squads. The section sergeant commands the section and receives the report from squad leaders at all formations. When a mortar section is attached to a combat car troop or squadron he commands the section and executes duties similar to those of the platoon commander of the platoon.

b. To form the section.—After indicating the place and formation to be taken, the section sergeant places himself opposite and 3 yards in front of where the right of the center vehicle of his section is to be, and commands: 1. ***Dismounted posts,*** 2. ***MARCH.*** At this command, the drivers of the squad vehicles drive vehicles into place and each squad takes position as indicated in paragraph 43*b*. When the section has been formed, the section sergeant commands: ***COUNT OFF.*** The command is executed simultaneously by squads. When the section is a part of the platoon the section chief takes his position 3 yards in front of the base vehicle of the section.

c. Mounted posts.—To mount the section in the vehicles, the section sergeant commands: 1. ***Prepare to mount,*** 2. ***MOUNT,*** and takes his post in the front seat of the base vehicle. Members of each mortar squad take posts mounted as prescribed in paragraph 43*c*.

d. Formations.—(1) The following formations are prescribed for the section with transportation:

Line.
Column.
Close line.
Close column.
Echelon.
Extended formations.

(*a*) *Line.*—Line is a formation of the section in which the squads are abreast with interval of 15 yards.

(*b*) *Column.*—Column is a formation of the section in which the squads follow one another in column with distance of 15 yards.

(*c*) *Close line.*—This is a formation of the section in which the squads are abreast with an interval of 5 yards.

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(*d*) *Close column.*—This is a formation of the section in which the squads follow one another in column with a distance of 5 yards.

(*e*) *Echelon.*—Echelon is a formation in which each squad in the section is 15 yards to the rear and 15 yards to the left of the preceding squad.

(*f*) *Extended formation.*—This is a formation in which the distance and/or interval is more than 15 yards.

(2) In column, the base vehicle is the leading vehicle. In line, the base is the center vehicle unless otherwise indicated. The normal post of the section sergeant is in the vehicle with the leading squad of his section. The messenger is transported with the second squad.

45. The platoon.—*a. Organization.*—The mortar platoon is comprised of two sections of three mortar squads each and the platoon headquarters. The personnel of the platoon headquarters are platoon commander, platoon sergeant (executive), reconnaissance sergeant, and driver of the command car.

b. To form the platoon.—(1) The platoon having arrived at the motor park, the platoon sergeant, after designating the place and formation to be taken, commands: ***DRIVERS TO THE FRONT.*** The chief of sections and drivers step three paces to the front, are closed in, and are then marched by the senior chief to the vehicles. Arriving at the vehicles, the chief of section in charge commands: ***CRANK UP.*** The drivers fall out, make the prescribed inspection, and start engines. Drivers then move vehicles onto line, or into the column formation designated by the platoon sergeant, in the order, command vehicle, 1st section, 2d section.

(2) When vehicles are formed on line or in column, the platoon sergeant commands: 1. ***Dismounted posts,*** 2. ***MARCH.*** The squads fall in as indicated in paragraph 43*b* and section chiefs take posts on the right of the corporal of the leading squad in their section.

(3) The platoon sergeant then commands: ***REPORT.*** Section leaders and the senior noncommissioned officer of platoon headquarters report, "All present or accounted for" or "(So many) men absent."

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c. Mounted posts.—At the command **1. *Prepare to mount,* 2. *MOUNT,*** members of the platoon take seats in vehicles at attention as prescribed for the sections.

d. Mounted drill.—Drill movements of the mortar platoon, mounted, or its elements, insofar as applicable, conform to those prescribed for the combat car troop. In mounted drill, the mortar platoon executes movements prescribed for the combat car troop, the mortar section corresponding to the platoon of the combat car troop.

e. Formations.—The following formations are prescribed:

Line.
Column.
Close line.
Close column.
Column of sections.
Line of section columns.
Echelon.
Extended formations.

(1) *Line.*—Line is a normal order formation of the platoon in which the squads are abreast with interval of 15 yards.

(2) *Column.*—Column is a normal order formation of the platoon in which the squads follow one another in column with distance of 15 yards.

(3) *Close line.*—Close line is a close order formation of the platoon in which the squads are abreast with interval of 5 yards.

(4) *Close column.*—Close column is a close order formation of the platoon in which the squads are following one another in column with distance of 5 yards.

(5) *Column of sections.*—This is a formation of the platoon in which the sections are in line and follow one another at 15 yards distance. (When at the halt, vehicles may close without interval or distance.)

(6) *Line of section columns.*—This is an extended formation of the platoon in which sections are on line, each section in column of squads.

(7) *Echelon.*—Echelon is a formation in which the squads are echeloned at 15 yards interval and 15 yards distance.

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(8) *Extended formations.*—Any normal formation may be extended. When it is so extended, it is known as an extended formation of the same name.

46. Drill.—*a. Purpose.*—The primary purpose of mortar drill is to teach all members of the mortar squad the duties of each member in putting the mortar in and out of action and accuracy and speed in handling all equipment. Thorough training of the individual in the duties assigned him is necessary to secure proper handling of the mortar in firing exercises.

b. Equipment.—The following articles of equipment carried on the 4.2-inch mortar carriage, T–5, are required for mortar drill:

4.2-inch mortar carriage, T–5, with mortar.
Sight, 4.2-inch chemical mortar.
Spade.
Pick mattock.
4 aiming stakes (1 modified).
1 rule (mil).
2 sets firing tables.

c. To place mortar in firing position (action).—(1) The ground on which the drill is to be held having been previously selected and the position for the mortar having been determined, the squad leader secures the aiming stakes from the mortar tool chest and establishes the line of aim representing the line mortar-target. Stakes should be from 25 to 50 yards from the vehicle. Having placed the stakes, the corporal, after pointing out the line established by the horizontal stake, commands: ***DRIVE INTO POSITION.*** The driver moves into position, placing the vehicle in prolongation of the line indicated by the horizontal stake. In section or platoon drill with the corporal mounted, the corporal directs the driver to halt the vehicle at the selected mortar position and commands: ***ACTION.*** At this command, the corporal and No. 1, leaving their seats in the vehicle from the left and Nos. 2 and 3 from the right, move at the double time to the rear of the vehicle and lower the mortar into firing position as follows: The corporal and No. 2 hold the base plate in place while No. 1 loosens the base plate retaining chain; No. 3 pulls the retaining chain through and lets it drop; Nos. 1 and 3 unbuckle the drag bar chains. The corporal then gives the command:

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PULL, at which command the corporal and No. 1 on the left side and Nos. 2 and 3 on the right side pull the base plate straight to the rear until the hinge on the carriage frame is clear of the channel bars. The corporal then commands: ***LOWER,*** at which command the base plate is lowered until it is about one foot from the ground. The corporal gives the command: ***DROP,*** to drop the base plate into position, causing the spade to mark its outline on the ground. If the ground is hard, the outline of the spade should be dug deep enough by No. 2 to insure a firm foundation for the base plate. At the corporal's command, the crew moves the base plate forward and No. 2 digs the narrow trench. The corporal then gives the necessary commands to return the base plate to its firing position. The corporal and No. 2 pull the pins locking the carriage frame to the base plate while Nos. 1 and 3 place the drag bars in position. No. 1 unbuckles the barrel strap. No. 2 removes the muzzle cover and places it on top of the right ammunition compartment. No. 2 pulls the lock pin from the elevating screw locking bar and lifts the barrel so that No. 1 can lock the elevating screw to the barrel. No. 2 replaces the elevating screw locking bar. No. 1 inserts the traversing crank in the traversing screw, centers the traversing and elevating mechanism, and places the sight on top of the left ammunition compartment. No. 3 secures the ammunition tool kit, inspects it for completeness, and places it on the right running board. No. 2 lays the cleaning rod across the frame members of the vehicle chassis. No. 3 inspects and prepares the ammunition. No. 1 secures the gunner's kit and places it on the left running board after inspection for completeness. The members of the crew then take their positions at attention as prescribed for members of the crew in "Posts" (*g* below).

(2) The aiming rods on the front brush guard and the windshield are also set in a line parallel to the vehicle center line, so that a sight taken over these rods on a target by the driver aims the vehicle and the mortar along the line mortar-target.

(3) After emplacement, the mortar may be traversed 200 mils right or left and elevated or depressed between 800 and 1,067 mils. A combination mortar sight, on which both deflection and elevation are set off, is used to lay the mortar by sighting at a vertical line on the center line of the vehicle.

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(4) The mortar, with attached carriage arms, may be entirely withdrawn from the vehicle and the mortar set up, laid, and fired as any surface set-up mortar.

d. To place the mortar in carrying position (out of action).—The command is: ***OUT OF ACTION.*** No. 1 replaces the sight in the left ammunition compartment and rolls the gunner's kit and places it in the mortar tool box. No. 2 replaces the cleaning rod. No. 3 rolls the ammunition tool kit and places it in the mortar tool box. The corporal recovers the aiming stakes. Nos. 1 and 2 place the side arms of the carriage frame in the base-plate slots and replace the pins. No. 1 detaches the elevating screw from the barrel, lowering it into its support when the elevating screw has been secured under its locking bar by No. 2. No. 2 replaces the muzzle cover while No. 1 buckles the barrel strap buckle. Nos. 1 and 3 lift the drag bar to its carrying position. The corporal and No. 1 on the left and Nos. 2 and 3 on the right of the base plate take position and at the command: ***LIFT,*** given by the corporal, raise the base plate until the side arms of the carriage frame are in prolongation of the channel bars. The corporal then gives the command: ***PUSH,*** at which command the base plate is shoved forward to its carrying position. The corporal and No. 2 hold the base plate in position while No. 3 runs the retaining chain through its rings. No. 1 hooks the chain to the fastening device and tightens the chain so that there is no play in the base plate or the drag bar chains. The members of the crew then take posts mounted in the vehicle.

e. To examine mortar equipment.—(1) The command is: ***EXAMINE EQUIPMENT.*** At this command each man examines his equipment as follows:

(*a*) No. 1 (gunner) examines the tool roll to see that the contents are complete and the oiler filled. He examines the mortar sight to see that it is in working order. He also inspects the elevating and traversing mechanism to see that the working parts are in good order. He examines the gunner's tool roll to see that the contents are complete.

(*b*) No. 3 inspects the ammunition to see that each round is complete and in good order. He also examines the ammunition tool roll to see that the contents are complete and in good working order.

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(*c*) The corporal examines the aiming stakes to see that they are not broken or cracked and that the spikes and tops are intact. He also examines the pick mattock and spade to see that they are serviceable.

(*d*) Nos. 2 and 3 examine the base plate for defects and to insure that all nuts and bolts are tight and in serviceable condition.

(*e*) No. 2 removes the base cap and muzzle cover. He removes the cleaning rod from the bore of the mortar for the inspection of No. 1 who sees that the barrel is clean, that the nuts and bolts of bands are tight and in serviceable condition, that the proper firing pin is installed and that it is tight, and that the base cap is screwed tight and is in serviceable condition. No. 2 also examines the cleaning rod.

(2) Equipment may be examined from march order posts when time does not permit placing mortar in firing position.

f. To inspect the mortar squad and equipment.—(1) When the mortar is in firing position, the squad leader commands: 1. ***Two yards in rear of equipment,*** 2. ***FALL IN.*** At this command, No. 1 places himself 2 yards in rear of the equipment and the remainder of squad forms on No. 1.

(2) To inspect the squad, the command is: ***PREPARE FOR INSPECTION.*** At this command the squad executes ***Right dress*** and ***front*** at the command of the squad leader and remains at attention until the inspection is completed.

g. To post the crew with mortar in firing position.—The command is: ***POSTS,*** at which command members of the squad take positions at the double time as follows:

(1) No. 1 stations himself on the left of the muzzle, facing the mortar.

(2) No. 2 stations himself to the right of the muzzle, facing the mortar.

(3) No. 3 stations himself to the right of No. 2, in front of and facing the right shell racks.

(4) The corporal supervises and assists Nos. 1, 2, and 3, when necessary. Before the ammunition becomes exhausted in the right shell racks, he may have to act in the capacity of an additional shell man in the transfer of ammunition from the left racks to those on the right.

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h. To stand clear of equipment or vehicles.—The mortar being in the firing position with equipment laid out on the ground, or at the march order, the corporal commands: 1. ***Two paces (or other distance) in front of (in rear of, to the right or left of) vehicle,*** 2. ***FALL IN.*** At the command ***Fall in,*** No. 1 places himself at the distance ordered and the remainder of the squad forms on him at the double time. The normal squad formation, dismounted, is taken.

SECTION VI

HEADQUARTERS AND SERVICE TROOPS

47. Headquarters troop.—With the exception of the mortar platoon, the personnel and vehicles of headquarters troop are normally distributed through the regiment. It, therefore, has no mounted drill as a troop. For dismounted formations, the troop conforms to the drill of the other troops of the regiment. Provisional squads are formed where necessary. Such personnel of the staff platoon as are present are normally attached to one of the other platoons or to troop headquarters.

48. Service troop.—*a. Organization.*—(1) The service troop is organized as an administrative unit for the purpose of forming a transport organization to function in the field, and in the garrison to train drivers and furnish a central pool from which the regiment may draw trucks and passenger cars for the normal uses.

(2) In addition to troop headquarters and the transportation platoon, it contains a maintenance platoon which functions as a salvage and repair unit for vehicles and organizes a semi-permanent repair center during the tactical phase of the regiment's operations.

b. Drill.—The service troop performs mounted drill only as a medium for training drivers to maneuver their vehicles in normal formations for marching, inspections, reviews, and ceremonies.

c. Formations.—Normal formations for the service troop are—

Column (close order and extended).
Line of platoon columns.
Column of platoons.
Line.

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FIGURE 41.—Headquarters troop.

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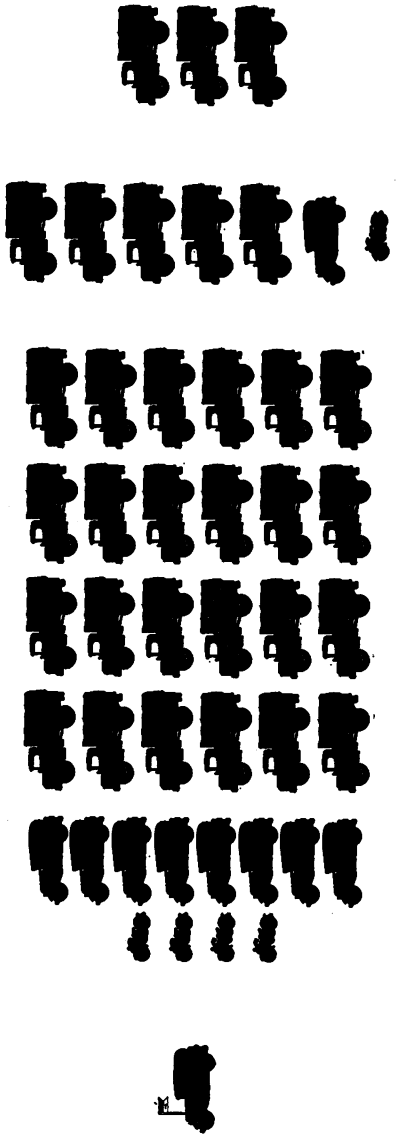

FIGURE 42.—Service troop.

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(1) *Column.*—In column formations, closed up, the distance between the vehicles is 5 yards. Extended order may be executed by increasing distances between vehicles or between platoons.

(2) *Line of platoon columns.*—Line of platoon columns is only used as an assembly formation in which the platoons are in a column of vehicles closed to 5 yards distance and 5 yards interval between platoons.

(3) *Column of platoons.*—Column of platoons is normally executed by moving vehicles to the flank from line of platoon columns and increasing the distance between platoons to 15 yards. This distance can be extended or closed if desired.

(4) *Line.*—The troop forms line only when directed by the troop commander. When the troop forms line, the troop commander's car is 10 yards in front of the center vehicle of the transportation platoon. The troop headquarters platoon forms 5 yards to the left of the transportation platoon and the maintenance platoon forms 5 yards to the left of the troop headquarters platoon. When the passenger cars are present, they form in line 5 yards in rear of the transportation platoon with the vehicle on the right directly in rear of the right truck of the transportation platoon. The motorcycles form opposite the right flank of the troop in column of vehicles with 5 yards distance between motorcycles. The platoon commander's vehicles are on line and to the right of their respective platoons.

d. Drill unit.—(1) The basic unit for drill is the platoon.

(2) The transportation platoon is divided in groups of four cars, each group acting as a platoon. All cars guide on the right or left vehicle as directed.

(3) The maintenance platoon forms a platoon of four vehicles in line with the wrecker following the platoon at 5 yards.

e. On the march.—The service troop on the march forms the regimental train including troop headquarters; transportation platoon, which includes the baggage and kitchen trucks of the regiment; and the maintenance platoon, which forms at the rear of the regiment and performs its function of maintenance directly under the maintenance officer.

f. Ceremonies and inspections.—(1) The service troop forms with the regiment for reviews in line, column of platoons, or line of platoon columns. When the regiment is formed in line

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of masses, the service troop normally forms on the left of the regiment in line of platoon columns at closed distances and intervals, with the transportation platoon formed in line of section columns, four vehicles in each column.

(2) When the service troop is inspected alone, it may be formed in any desired formation. The usual formation for troop inspection is column of platoons, with the transportation platoon divided in groups of four vehicles, each group acting as a platoon. The troop habitually forms in closed formation with 5 yards distance and interval between vehicles in the following order:

(*a*) Troop commander and 1st sergeant in passenger vehicle.

(*b*) Transportation platoon (24 trucks, 2 solo motorcycles, 2 motorcycles with side car, and 8 light passenger cars).

(*c*) Maintenance platoon (4 trucks, 1 truck, heavy, wrecking, 1 motorcycle with side car, 1 passenger car).

(*d*) Troop headquarters (3 trucks).

SECTION VII

REGIMENT AND BRIGADE

49. Formations and orders.—Ordinarily regiments and brigades do not engage in close order drill mounted. However, these units may be formed and maneuvered by their commanders in accordance with the principles of drill governing their subordinate units. The commander merely indicates the formation or disposition desired, relinquishing to the next subordinate unit commanders the decision as to the method of accomplishment. Orders may be transmitted by radio, messenger, or visual signals.

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CHAPTER 3

CEREMONIES AND INSPECTIONS

SECTION I

GENERAL

50. Dismounted ceremonies.—Dismounted ceremonies conform to the provisions of ceremonies and inspections as prescribed in CFM, volume I.

51. Standards.—At all mounted formations in which the regimental standards are present, they are mounted on a command car of regimental headquarters and posted as appropriate for the ceremony. The guard to the standards consists of two mounted motorcyclists armed with submachine guns.

52. The band.—At mounted ceremonies the band and buglers are formed dismounted and take post 25 yards to the left and 5 yards in rear of the reviewing officer.

53. Rules for personnel at mounted ceremonies.—*a.* No men expose themselves through turret doors.

b. Personnel other than officers and drivers riding seated in open vehicles fold their arms.

c. Regimental, squadron, troop commanders, and platoon leaders salute when passing in review.

d. All changes from dismounted to mounted posts and reverse are executed at double time.

e. Cooks riding in the bodies of kitchen trucks wear white cooks' uniform.

54. Formations.—In mounted ceremonies, the regiment habitually forms in close line of platoon columns. In squadron or troop ceremonies the formation is habitually close line. The regiment forms for inspection in column of troops in close line.

SECTION II

REVIEWS

55. General.—*a.* Regimental review only is prescribed herein.

b. Squadron review is carried out on the same principles; the initial formation, however, is habitually close line.

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56. Formations.—To form close line of platoon columns—

a. Troops form in order from the right: Armored car troop, 1st squadron, 2d squadron, machine-gun troop, headquarters troop, service troop.

b. All supply and maintenance vehicles are attached to and form with the service troop.

c. Standards form as directed, normally on the left of the 2d squadron.

d. Prior to adjutant's call, all vehicles are in position and personnel is formed dismounted, each troop in line, 3 yards in front of the line of vehicles.

57. The review.—*a.* At adjutant's call, troops are brought to attention. The adjutant reports the formation of the regiment and takes his post.

b. The regimental commander presents the regiment to the reviewing officer as follows:

(1) At the command 1. ***Present,*** 2. ***ARMS,*** the regiment executes the movement as one unit; personnel armed with the rifle executing present arms, others the right hand salute.

(2) When the regimental commander presents the regiment to the reviewing officer, the band plays the honors appropriate to the rank of the reviewing officer.

(3) The regimental commander commands: 1. ***Order,*** 2. ***ARMS.*** The regiment returns to attention as one unit.

c. The regimental commander then faces the reviewing officer. If the reviewing officer desires to ride around the regiment, he mounts his car and approaches the regimental commander. The reviewing officer and regimental commander then ride around the command.

58. To pass in review.—*a.* After the reviewing officer has ridden around the command, or if he indicates he does not so desire, the regimental commander faces the regiment and commands: 1. ***Pass in review,*** 2. ***MOUNT.*** At the command of execution, all personnel break rank and mount at the double time.

b. Movements to pass in review are as follows:

(1) *By the right flank.*—Executed successively by platoons at the command to pass in review.

(2) *By the left flank.*—Executed successively by platoons in order to make the first change of direction at the right of line.

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(3) *By the left flank.*—Executed successively by platoons in order to make the second change of direction before passing the reviewing officer in column of platoons.

c. The speed of march is dependent upon the nature of the ground, but will be at least 15 miles per hour when passing the reviewing officer.

d. After passing well beyond the reviewing officer, platoons break into column and leave the field by an appropriate route.

SECTION III

INSPECTIONS

59. General.—The distances and formations prescribed for regimental mounted inspection may be varied to suit the size and shape of the drill field. Inspection of subordinate units with or without field equipment conforms as far as appropriate.

60. Formations.—*a.* Column of troops formed in order as follows: headquarters troop, armored car troop, 1st squadron, 2d squadron, machine-gun troop, and service troop. Troops form in close line with 15 yards distance.

b. Order of vehicles from the right to left in each troop is combat vehicles, supply vehicles, maintenance vehicles, and kitchens. The latter will form at 30 yards interval from the others.

c. When each element has been alined, personnel will be dismounted and each car crew will form 3 yards in front of its vehicle.

d. When all elements are in position as indicated above, the adjutant reports the regiment to the commanding officer.

e. After receiving the adjutant's report, the commanding officer directs the troops to prepare for inspection.

61. Preparation for inspection of full field equipment.—*a.* Shelter tents are pitched on the left of the column in prolongation of the line of troop vehicles after the right of each line of shelter tents has been established by the adjutant.

b. Individual equipment and dismounted machine guns are displayed in front of shelter tents.

c. Vehicle tools are displayed in front of vehicles, hoods and equipment boxes opened, and supply vehicle canvas in place.

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d. Vehicle loads are unloaded and displayed in rear of vehicles except kitchen equipment which is displayed on the left of the kitchen truck.

e. Troop officers' tents are erected facing their respective troop lines, the front of the right tent on line with the front of the vehicle line and 20 yards from the right vehicle. Alinement is made on the leading troop by the adjutant.

f. Regimental and squadron officers' tents are pitched in one line 20 yards in rear of the troop officers' line.

g. Troop latrine screens are erected 30 yards to the left of each troop line. The officers' latrine screen is erected 30 yards in rear of officers' tents.

h. Standards are placed in front of the commanding officers' tent. Guidons are placed in front of troop officers' tents.

i. As soon as its field equipment has been displayed, the band forms at the head of the regiment to play during inspection.

62. Inspection procedure.—After preparations for inspection have been completed, the regimental commander inspects each troop in the following order:

a. All personnel posted at their shelter tents.

b. Vehicles and equipment.

63. Other types of inspections.—Other types of inspection may be ordered as desired. The procedure conforms insofar as practicable to that prescribed herein.

SECTION IV

ESCORTS

64. Function and procedure.—The function and procedure of escorts generally follows that prescribed in CFM, volume I, with the following modifications:

a. When space permits, a mounted escort forms in close line facing the road on which it is to move.

b. Personnel take dismounted posts, buglers forming separately on the right.

c. When space does not permit, the escort forms in column, dismounted personnel taking post on the flank of their respective vehicles.

d. If necessary in the interest of public safety, car commanders may be authorized to observe from turrets while the escort is marching.

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65. The ceremony.—When the individual to be escorted approaches a position in front of the escort, the escort commander from his post in front of the center of the escort commands: 1. ***Present,*** 2. ***ARMS,*** and causes the buglers to sound the appropriate honors. After such inspection as the individual to be escorted desires to make, the escort is mounted and moves out in column successively from the appropriate flank. The same ceremony is repeated at the destination of the escort.

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CHAPTER 4

COMBAT TRAINING OF SMALL UNITS

SECTION I

GENERAL

66. Scope.—This section contains the tactical principles applicable to troop leading of all units up to and including the troop. Principles applicable to troop leading of each type of squad, platoon, and troop are set forth in separate sections of this chapter. Principles governing the employment of units larger than a troop are set forth in CFM, volume III.

67. Characteristics of cavalry.—*a.* The characteristics of cavalry are mobility, fire power, and shock.

b. Mechanized cavalry is particularly characterized by greater strategical mobility than horse cavalry, greater fire power and shock, and protective armor. By virtue of its equipment, it is able to perform the normal cavalry missions at great speed. It is limited by a greater sensitivity to terrain than horse cavalry and by the difficulty of its supply and maintenance.

68. Functioning of mechanized cavalry.—The tactical functioning of mechanized cavalry may be divided into four classifications; reconnaissance, striking power, fire support, and defense against hostile antitank weapons. The regiment is the smallest mechanized cavalry organization containing all of these elements.

a. Reconnaissance.—The reconnaissance elements perform reconnaissance missions up to 100 miles in advance of the regiment and also perform the subsequent close-in reconnaissance.

b. Striking power.—The combat car elements furnish the striking power of mechanized cavalry and break the hostile resistance.

c. Fire support.—The machine-gun elements furnish the ground fire support in the following ways:

(1) By firing on crews of hostile antitank guns.

(2) By displacing forward on the heels of the attack to organize the first objective and cover the assembly and reorganization of the attacking units.

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(3) By repelling the counterattack of hostile mechanization.

(4) By covering the withdrawal.

d. Defense against hostile antitank weapons.—The mortar elements lay down smoke on the hostile antitank area to prevent hostile gunners from bringing well-aimed fire on the advancing vehicles. The mortars thus constitute the means of neutralizing hostile antitank weapons, whether these weapons are in position on the ground or mounted in hostile combat vehicles.

69. Methods of fighting.—The mechanized cavalry regiment has three distinct ways of imposing its will on the enemy:

a. By supported assault of combat cars against a given objective.

b. By placing combat vehicles in favorable positions from which effective fire can be delivered upon the enemy.

c. By a combination of these methods.

70. Front of attack.—The mechanized attack may be made on a very widely extended front or on a very narrow front, depending upon the terrain and the disposition of the hostile force. When the attack is made on a narrow front, the mechanized attacking elements normally will be disposed in depth.

71. Speed of movement.—The speed of movement of mechanized cavalry will vary from the slow, covered advance of 7 or 8 miles per hour up to the quick thrust at a speed of 45 miles per hour. The normal rate of march of mechanized cavalry on the road is approximately 25 miles per hour.

72. Use of terrain.—Terrain has a decisive influence on the use and operation of mechanized cavalry. Cavalrymen must avoid serious obstacles to movement and take full advantage of terrain favorable to observation, concealment from view, and avoidance of, or protection from, hostile fire. This applies especially to the selection of, and approach to, the firing or assault position.

73. Training of personnel.—*a. Command and leading.*—(1) Mechanized cavalry leaders must be energetic, enterprising, and always ready to seize opportunities for the employment of their commands in furtherance of the plan of the higher commander. They must be quick to estimate a situation and be able to make known their decisions promptly in clear, concise orders.

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(2) The initiative of subordinates must be developed in order that they may be prepared to act promptly and correctly in any situation not covered by detailed instructions.

b. Scouting and patrolling.—All personnel of mechanized cavalry units should be trained in scouting and patrolling as covered in CFM, volume I, and chapter 9, BFM, volume I, so far as they apply.

SECTION II

THE ARMORED CAR

74. General.—The nature of the missions assigned the armored car troop of a mechanized regiment of cavalry frequently requires it to operate at a distance from the regiment and semi-independently thereof.

75. The car.—*a.* An armored car has mobility, fire power, armor protection, and a long radius of action.

b. The mobility of the car, combined with its long radius of action, adapts it for use on reconnaissance. Its ability to move at speed is an essential factor in the protection of the crew and vehicle. Although normally employed on roads, it moves across country when necessary and in order to further its mission; however, it is terrain sensitive.

c. The caliber .30 and caliber .50 machine guns provide a heavy fire power for instantaneous use against personnel and matériel. Each car has a ground gun which is effective for close-in mounted combat and for use with dismounted patrols.

d. Armor gives the car reasonable protection against small arms fire and a sense of security and protection to the crew which is conducive to boldness.

e. The car has a safe cruising distance of at least 150 miles on one fill of gasoline.

76. Leadership.—*a.* The strategical and tactical speed of mechanized operations, the independent nature of its operations, and the vehicular vulnerability to antitank weapons and road ambuscades demand bold, energetic, and cool leadership in armored car elements.

b. The car commander exercises the greatest vigilance in the supervision of the upkeep of his car. Constant inspections to insure proper cleaning, adjustments, and servicing are essential to maintain the car at a high standard and conserve its power dur-

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ing normal usage; also to keep it always prepared for extreme efforts.

77. Training of personnel.—*a.* Armored car operations demand that the unit promptly take advantage of each favorable situation or equally promptly take appropriate countermeasures in unfavorable situations. Therefore, all personnel must not only be familiar and proficient with their own principles of employment and weapons but must also understand those of the troops with which they are operating.

b. The efficiency of the car depends on the manner of execution of their specific duties by the several members of the car crew. In order that a car may continue functioning in case of casualty to one or more of the crew, each must be able to perform the duties of the others.

c. Since the platoon is the combat unit and normally operates beyond close supporting distance of the troop, it must acquire a maneuvering ability instantly responsive to the will of its commander.

78. Control and communication.—*a.* Control of armored car units must be rapid, flexible, and dependable. Control is exercised by physical leadership as far as practicable and is supplemented by available means of communication.

b. Communication includes visual arm, flag, and light signals, radio and motorcycle messenger.

c. Due to the great dispersion of an armored car troop under normal tactical requirements, the most important means of communication is the radio. Direct radio telephony between commanders concerned is the quickest and most satisfactory method. Due to the necessity of the troop maintaining radio communication to the rear with regimental headquarters, to the front with three or four separate platoons, and possibly with cooperating air service, it is essential that all messages be brief and clear and that the strictest radio discipline be observed. Whenever a platoon is in troop reserve, its command car may be used in either the troop or regimental net.

d. When radio is not available or the distance involved does not warrant its use, motorcycle messengers are employed.

e. Cooperation between aviation and armored car units requires direct communication which is maintained by radio, by dropped messages, and by panels.

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f. Communication is maintained within the platoon by the several forms of visual signals and by motorcycles.

79. Units.—*a.* The armored car troop provides the regimental commander his chief element for reconnaissance as well as a unit of great fire power and road mobility capable of offensive and defensive action in situations involving limited objectives on favorable terrain. Whenever practicable, the troop moves out one or two hours before the regiment in order to have sufficient time for reconnoitering and subsequently rendering reports without delaying the regiment and in order to give the regimental commander ample time to take full advantage of the hostile information sent back to him.

b. The platoons are the tactical units through which the troop commander carries out his mission. It is essential that the tactical characteristics of the platoon be thoroughly understood.

(1) The following tactical characteristics facilitate the successful employment of the armored car platoon:

(*a*) High mobility on roads.

(*b*) Long radius of action.

(*c*) Ability to transport quickly a potentially heavy fire power to a desired area.

(*d*) Minimum time required to go into or withdraw from action.

(*e*) Moral effect of sudden appearance.

(*f*) Equipped for effective fire against personnel and matériel.

(*g*) Weapons mounted so as to admit of immediate employment.

(*h*) Liberal supply of ammunition with guns.

(*i*) Invulnerability to small-arms fire.

(*j*) Rapid and flexible communication.

(2) The following limit the successful employment of the armored car platoon:

(*a*) Mobility dependent on gasoline and lubricant supply and on mechanical functioning.

(*b*) Limited cross-country ability dependent on terrain.

(*c*) Difficulty of operating unobserved in vicinity of the enemy.

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(*d*) Susceptibility to delay by road blocks.

(*e*) Restriction of operations due to darkness.

(*f*) Unsuitability for locating small bodies of the enemy and for combing an area.

(*g*) Vulnerability to antitank weapons.

c. In assigning missions to an armored car unit, consideration is given to the road net and terrain involved. The armored car commander is given all available pertinent information useful in formulating his plans and executing his mission. This includes information of enemy and friendly troops and the mission and general plan of the regiment. The mission will be defined in detail.

SECTION III

ARMORED CAR PLATOON

80. Execution of missions.—The platoon commander on receiving a mission is responsible for the method of execution.

a. Throughout the execution of the mission, the following principles are observed:

(1) The platoon avoids combat except when necessary for the success of the mission. In general, an armored car platoon should not fight to attain a reconnaissance objective if its mobility allows it to side-step intervening hostile resistance.

(2) In the vicinity of the enemy, the platoon maintains sufficient depth to minimize the effect of hostile fire and movement.

(3) Continuous observation and alertness on the part of every member of each car crew are required to prevent the platoon from failing in its mission due to hostile ambuscades or surprise attacks.

(4) To facilitate opening immediate fire, all cars when operating in a close situation keep their turret guns trained on the nearest likely position for potential targets.

(5) During halts in the vicinity of the enemy, observation and security are automatically insured by charging No. 1 car with that responsibility to the front, No. 2 to the right, No. 3 to the left, and No. 4 to the rear.

(6) Irrespective of the assigned mission of the platoon, the commander conducts a thorough road reconnaissance on his route of march for the purpose of keeping his troop com-

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mander informed of road conditions encountered which would affect the normal march of the regiment thereon. Likewise, during battle reconnaissance he carries on a similar terrain reconnaissance in his area of operation.

(7) The platoon uses every means available to maintain contact with the troop command post, bearing in mind at all times that the principal reason for its existence is to facilitate the mission of the regiment by promptly securing and transmitting information.

(8) Although a platoon in general has an aggressive attitude, it resorts to concealment or flight when such action is more conducive to the accomplishment of the mission.

b. (1) Combat is at times essential to the success of the platoon on any of its assigned missions. Successful armored car combat demands a prompt and vigorous execution of the leader's decision. Armored cars fire when moving and stationary. Stationary fire is the more accurate. However, armored cars avoid halting to return hostile fire except when the the car, less the turret, is defiladed from such fire. A platoon endeavors to avoid losing its freedom of maneuver by becoming too closely engaged with the enemy, or by the commitment of the entire platoon to a defile or route which might be blocked at the far end. Its formation should never allow the entire platoon to be taken under surprise fire from a critical position nor should it be such as to uncover its rear. A platoon should never be committed against too strong an enemy or position. When the mission permits, operations against the hostile flanks and rear of a less mobile force offer greater opportunity for success.

(2) When taken under surprise fire, continued mobility and rapid attainment of fire superiority are essential. Cars not taken under fire furnish the maximum mutual support by fire and movement. The primary fire targets are antitank weapons.

(3) When the leading car runs into a hostile force, it utilizes its maximum fire power to inflict the greatest damage while the situation is favorable. The primary fire targets are antitank units which should be destroyed before they get into action. The leading car does not hesitate to close when the terrain affords sufficient observation to show that the enemy

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can be brushed aside. Care is taken by the car commander not to cause the commitment of the entire platoon to a particular type of action independent of the plans of the platoon commander. The platoon commander, informed of the encounter either from the firing or by means of communication, decides on the immediate employment of the platoon to support No. 1 car without committing the platoon to a general advance unless personal reconnaissance so warrants. This assistance will usually be the quick occupation of a firing position which commands the situation. Observation to the flanks and rear are essential to prevent the enemy blocking the route of possible withdrawal.

(4) When the leading car is stopped by a road block, it opens maximum fire on the hostile defense and withdraws to defilade. If the mission demands a forward reconnaissance of that route, or the platoon commander's reconnaissance reveals a weak defense, he may attempt to force the road block. This is usually accomplished by the second section maneuvering around a flank of the hostile defense under supporting fire of the first section.

(5) Should the enemy be sighted before he sees the platoon, every precaution is taken to prevent disclosing the platoon's presence. The car, observing the enemy, halts at the nearest cover and informs the platoon leader, who transmits the information to other elements of the platoon and quickly makes a reconnaissance from the vicinity of the reporting car. The second section keeps the platoon leader under observation for signals and takes sufficient distance to facilitate probable employment and at the same time cover the rear of the platoon. Should the mission and immediate situation require combat, the platoon leader decides on offensive or defensive action. Aggressive action generally consists of action by fire and movement against the hostile flanks, where heavy surprise fire is most effective and easily obtained. Defensive action consists of occupying a firing line and causing the enemy to deploy preparatory to attacking the line. When combat is incidental to securing identification or combating hostile armored cars, an ambush should quickly be set. Consideration must always be given to the terrain, road net, and mutual supporting action between elements of the platoon.

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c. During combat, elements of a platoon may be separated. When conditions prevent the designation of an assembly point at the time combat orders are issued, separated elements will return to the platoon axis of movement and halt thereon at the first critical point in the general direction of movement.

d. Dismounted combat often results from dismounted patrolling. Dismounted patrols are formed from the personnel of the vehicles. Some gunners and drivers are always left in the vehicles in order that the vehicles may remain mobile. The submachine gun is the principal weapon of dismounted patrols.

81. Reconnaissance.—*a.* A platoon sent out on a reconnaissance mission must not allow intermediary developments to interfere with obtaining the desired information. The temptation to engage targets of opportunity and fight its way through hostile detourable resistance encountered en route must be guarded against. The most effective reconnaissance platoon is the one that sees without being seen.

b. Information received from inhabitants, discarded enemy equipment, tracks, old bivouac areas, etc., may disclose valuable information when evaluated at higher headquarters.

c. On receipt of a mission, the platoon leader issues a warning order, secures the required maps, and estimates the situation. Prior to starting he inspects and gives the platoon its orders, which include the situation, mission, plans, route, alternate route, and first assembly point. These assembly points are closer together as the platoon approaches probable hostile contact.

d. The platoon commander rides in No. 2 car and the platoon sergeant in command of the second section rides in No. 3 car. No. 1 car acts as the point. No. 2 car follows in rear of No. 1 car at such distance as to permit the latter to accomplish its functions. It is prepared to assist No. 1 car by instant supporting fire on any hostile targets that may develop. In a like manner the second section mutually supports the first section. When an element gains a critical point, the following element rapidly closes on it. Each element keeps the preceding element under observation except for short periods of defilade due to accidents of the terrain. This method of marching and deployment in depth, which is resorted to in all areas where hostile contact is

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expected, assures freedom of maneuver for the platoon and minimizes the target presented to the enemy.

e. In passing through a village, over a bridge, or through a defile, the passage by the leading element is covered by the remainder of the platoon from a position on the near side with guns sighted on possible hostile positions. The remainder of the platoon moves out when the leading element has secured the far exit.

f. In reconnoitering a village suspected of containing hostile troops it is best to approach the area from the rear or flank. A detailed reconnaissance with field glasses is made from a convenient observation point, followed by a mounted reconnaissance around the perimeter of the village, which will usually disclose the presence of hostile forces if there are such forces. A more detailed reconnaissance through the streets of the village is then made.

g. The reconnaissance of a hostile column on the march is best performed by observation from several successive observation positions on the flank of the column.

h. The reconnaissance of a hostile camp is made by successively approaching the areas from several directions on the flanks and rear to secure observations. As stealth is essential it may be necessary to perform the latter part of these approaches by small dismounted patrols operating within supporting distance of the concealed armored cars.

i. When on a mission of battle reconnaissance the platoon commander upon his own initiative promptly and vigorously employs his maximum effectiveness to counter any hostile development which constitutes an immediate threat to the success of the regiment in combat.

82. Delaying and harassing action.—*a.* The skillful use of the speed, maneuverability, and the fire power of the platoon, at successive positions, enables it to impede the advance of the hostile force or break down his resistance. In delaying action the platoon accomplishes its mission by successively occupying positions between the hostile force and its objective, thus necessitating the hostile column to deploy frequently for attack. When favorable opportunities offer, surprise attacks are made against the hostile flanks, provided such action does not prevent the platoon from quickly regaining its position in front of the

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enemy advance. In harassing action the platoon annoys and wears down the hostile resistance by frequent surprise attacks against the enemy's front, flanks, and rear. In both types of engagements elements of the platoon may be dispersed in width and depth but never beyond mutual supporting distance. The platoon, although at times employing short range intense surprise fire, is always on the alert to prevent hostile flanking action to cut off its route of withdrawal.

b. In delaying action the withdrawal from successive positions may be done by the platoon as a unit, although it is generally accomplished by sections leap-frogging and mutually supporting each other.

c. A delaying position should be such that the enemy must attack it, consume much time in avoiding it, or abandon his advance. The ideal delaying position for armored cars is one covering the route of the enemy at a point where his advance is limited to a narrow front, such as a bridge or defile. Such a position should have good observation, a field of fire at mid and long range, and a route of withdrawal free from hostile observation and fire.

d. Efficient communication between elements of the platoon is essential for their responsive action to the will of the commander.

Section IV

ARMORED CAR TROOP

83. Execution of missions.—In the employment of the armored car troop the road net and terrain will usually indicate a certain assignment of missions to the platoons, the execution of which is entrusted to the platoon commanders.

a. In assigning missions to the platoons the following basic principles should be observed:

(1) The platoon is the basic tactical unit.

(2) Each platoon is assigned a mission.

(3) Each platoon is assigned a zone or route.

(4) Normally one platoon is held in troop reserve.

b. Maximum efficiency in armored car operations, where situations are presented and changed so rapidly, is only possible when every member of the troop has a thorough knowledge of the situation, mission, and orders.

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c. As the troop command post will generally be operating at a distance from the regiment and the platoons will be operating over a wide front at a distance in advance of the troop command post, one of the most important problems is assuring the transmission of hostile information from the advance platoons to the rear. Thus the troop commander must always have a prearranged alternative means of liaison which is effective when primary means become inoperative.

d. All information received from the platoons and other sources is evaluated and the necessary measures are taken to assure the timely receipt by the regimental commander of information desired. This includes road net factors affecting the march of the regiment. The latter information must reach the regiment before it has passed the last junction of an alternative route.

e. The platoons are kept under control at all times. This is acccomplished by assigning them definite missions, prescribing routes or zones, and prescribing limits of operation or control lines beyond which they do not pass until stated times or further orders. In adddition, platoons are ordered to check in by radio at stated hours.

f. The troop commander coordinates the platoon efforts and assures continuity of operation by use of the reserve platoon. He does not hesitate to move with his reserve platoon to assist the action of another platoon if the fulfillment of the troop mission depends on the success of this particular platoon's operation.

g. The troop command post usually marches on the intended route of march of the regiment. The troop command post is advanced from one selected location to another. All elements are kept informed of the location of the command post. These locations should fulfill the following requirements:

(1) Permit satisfactory radio communication and rapid motor liaison to all elements concerned.

(2) Should be at easily located geographical features.

(3) Should coincide with the location of the reserve platoon.

h. When hostile contact becomes imminent, the troop repair truck is hidden from hostile observation outside the probable area of contact or joins the regiment.

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i One of the principal functions of the troop is to furnish road information upon which the regimental commander can make early decisions as to the route of march of the regiment. Information of road conditions which might affect the normal march of the regiment is promptly furnished by the platoons to the troop for transmission to the regiment.

84. Reconnaissance.—*a.* The armored car troop assists the regiment in its several missions by vigorous reconnaissance for the purpose of gaining information of the enemy, of the terrain, or of resources in the theater of operations.

(1) Prior to contact, it reconnoiters the zone of advance, gains contact with the hostile force, and determines its general size, composition, disposition, and movements, including location of the hostile flanks. This reconnaissance extends around the hostile flanks to secure information of the hostile disposition in depth.

(2) When the regiment is committed to combat, the armored car troop maintains battle reconnaissance. This consists of continuous observation of the hostile flanks and rear for the purpose of securing timely information of changes in disposition and observing possible routes over which hostile reinforcements might advance. Elements of the armored car troop may be used in active reserve.

(3) After combat, the armored car troop carries out intensive reconnaissance and delaying and harassing action against the head and flanks of the hostile column, either in pursuit or while covering a withdrawal.

b. In general, the effectiveness of reconnaissance is in direct ratio to the degree of cooperation maintained between aviation and the armored car troop. Terrestrial reconnaissance is greatly facilitated by timely information from observation aviation on—

(1) Location of and approaches to the reconnaissance objective.

(2) Hostile forces in the zone of reconnaissance.

(3) Information on road blocks and hostile armored cars on routes of advance.

c. Reconnaissance of an enemy disposed on a broad front, whether in place or advancing, is accomplished by assigning zones of action to platoons. The width of the zones will be de-

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pendent on the road net, the terrain, visibility factors, and the strength, mobility, and probable reaction of the enemy.

d. When reliable information indicates the route of the enemy's advance, definite routes of reconnaissance are assigned to platoons.

85. Delaying and harassing action.—*a.* The operations of the troop in delaying and harassing actions are so similar that both are considered together. In delaying action, as the additional requirement of the mission is to impede the advance of a hostile force on its objective, early contact is desirable.

b. The troop commander initiates reconnaissance to locate the hostile force and thereafter controls the action by assigning routes or zones of action for the platoons and changing them as the situation demands. He keeps constantly informed of the action of the platoons, coordinates them, and employs his reserve platoon to further his mission.

c. Maximum delays are made at natural terrain features, such as streams or ridge lines, where the width of the enemy formation is narrowed into one or more columns.

d. It is advisable to take up additional successive positions rather than hold one position so long as to run the danger of commitment to general combat or of allowing the enemy to cut off the avenue of withdrawal by a flanking movement.

e. The assignment of one or more platoons to operate against the enemy's flanks is most effective in furthering the troop's mission.

86. Special missions.—*a. Covering.*—(1) The troop may be employed to cover the regiment on the march. This necessitates preventing the hostile forces from contacting the regiment. Likely routes of hostile advance leading to the regiment must be denied to the enemy. Due to the limited number of tactical units available, observation and delay should be made along a line through which the hostile force must pass and which has a limited number of crossings. Such favorable lines are usually along streams, ridges, or wooded areas.

(2) When the troop is employed to cover an exposed flank of the regiment on the march, it does so by occupying successive key positions on a parallel route. The road net, terrain, and the mobility of the enemy determine the distance the troop operates from the regiment. The time necessary to block the

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successive likely avenues of hostile advance is dependent on the movement of the regiment and the potential enemy time distance between the key positions and the regiment. When the hostile threat is not confined to a limited number of approaches, all elements of the screen are moved forward simultaneously to cover the next probable routes of hostile advance.

b. Securing a key position.—The troop may be employed to secure a key position. In such operations, should the enemy be at some distance from the objective, rapid reconnaissance and early delaying action are conducted. The characteristics of the troop offer greater probability of success by such action than by a passive defense on or near the position. However, at least one platoon is assigned the immediate defense of the position. Should the enemy's disposition be unknown, defensive measures on or near the position, with limited reconnaissance in the most likely direction of the enemy, are undertaken.

SECTION V

COMBAT CAR UNITS

87. Characteristics.—Combat cars furnish the striking power of the regiment. Their armament consists of both antimechanization weapons and weapons for use against hostile personnel. They possess fire power, mobility, and protection. Due to their weight and construction, they add to these three basic attributes two more, those of crushing power and shock. Therefore, the characteristics of a combat car are summed up as being five in number, as follows:

Fire power.
Mobility.
Protection.
Crushing power.
Shock.

88. Supporting elements.—*a.* The combat car units are assisted by the reconnaissance units, the machine-gun units, and the mortar units. In addition to these supporting elements, there is also usually attached artillery. Since all elements of the combat team possess great mobility, hostile artillery finds it difficult to have time to range on them. In the attack, mechanized cavalry elements may generally expect to receive from

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friendly artillery a considerable amount of support. This supporting artillery fire is usually suddenly laid down on the first line of hostile resistance and as suddenly lifted to opportune targets among hostile rear installations.

b. Neither the combat car troop nor the combat car squadron is a self-contained element. They must operate in conjunction with supporting elements from other troops. The combat car squadrons constitute that part of the mechanized cavalry regiment which makes the main attack and habitually fights mounted. By use of antitank guns, while halted under suitable cover, they engage hostile mechanization; by use of their smaller machine guns, while moving to the attack, they neutralize personnel targets.

89. Reconnaissance.—Considering the characteristics of a combat car, mobility alone lends itself readily to the accomplishment of a reconnaissance mission. The noise of the motors prevents the turret man or any other member of the crew from hearing. Track noise is also a hindrance. The element of stealth is wholly lacking. If speed is reduced to reduce noise, mobility and celerity are likewise reduced. A reconnaissance in force to secure definite information within an area may be made successfully by combat cars. Their approach to an area should be made swiftly.

90. Security.—*a. Bivouac.*—(1) The combat car elements are habitually a part of the main body and are a part of the main bivouac of any body of troops with which they may be operating. With their machine guns, they may materially strengthen the security of the camp by organizing assigned sectors for close-in defense and so disposing the vehicles that they may be mutually supporting with bands of fire.

(2) The combat cars should be hidden from ground and air observation and covered by small posts from other elements. They should be faced in the direction in which they may be required to act. Intersecting bands of fire should habitually be established by traversing the turrets. Sentries should be posted and crews should bivouac at their vehicles. All guns should be alerted and half-loaded. A thorough reconnaissance of the vicinity should be made with a view to movement either by day or by night. If there are several likely routes of approach to the bivouac favorable to hostile employment, several

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small detachments of combat cars may be placed in their vicinity, the main body of cars being held in reserve ready for employment.

(3) Since the present combat car is entirely track-laying, and since even a convertible type can only move off hard roads on tracks, care must be taken to obliterate track marks visible from the air. In sandy or loose soil a drag may be used. In resilient ground, wheeled vehicles may be run over the tracks. Mounted troops riding the track will obliterate it most effectively. Plans must be made to insure cars moving in columns and in exact trace. Bivouacs to be occupied at night should not be occupied by daylight. The nearer a bivouac is to a hard surfaced road the better, for there is then a minimum of track marks to obliterate.

b. Advance guard.—In advance or rear guard operations, the combat car, supported by machine guns, plays the principal role. Normally, a mechanized advance guard is composed of a combat car element with machine guns attached. Since their strength lies in offensive action, combat cars are admirably suited for brushing aside light hostile opposition and insuring the uninterrupted march of the main body. Supported by the fire power of the attached machine guns combined with its own fire power, mobility, and cross-country ability, the combat car elements can force the deployment of larger forces encountered, thus delaying their advance and furnishing the commander opportunity for reconnaissance and the formulation of a plan. Finally, the combat car element can furnish a pivot about which the attacking squadrons may be maneuvered.

c. Rear guard.—In rear guard action, combat cars employ their ability to attack swiftly and unexpectedly with fire, first from one direction, then from another. With machine guns near the axis of movement to deny that axis to the enemy and with a small reconnaissance detachment to furnish information as to enemy dispositions along that axis, the combat car element should seek to force a hostile deployment by surprise fire from a flank, withdrawing before becoming heavily engaged.

91. Offensive combat.—Due to its characteristics of fire power, mobility, protection to crew, crushing power, and shock, the combat car is most advantageously employed as a weapon of offense. Its fire power is capable of use against hostile mechani-

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zation as well as against enemy personnel. Its mobility is excellent on roads and across country. Protected by its armor, the crew may employ the fire of their guns with the maximum of effect. The crushing power and shock of combat cars reduce hostile resistance and open avenues of approach to vehicles of lesser mobility and to supporting troops.

a. Control.—One of the greatest problems of offensive action is the matter of control. The ideal in combat car leading would be to control the unit with all ports closed, purely by example. The degree of success of combat car operations in battle will depend fundamentally on the perfection of combat car drill attained in rear areas.

b. Methods of fighting.—It is possible to divide the combat car methods of fighting into two distinct categories: first, by supported assault against a given objective; second, by fire from favorably placed vehicles. The assault may again be subdivided, on a basis of formations, into a deployed formation with elements in line, echelon, or deployed in depth, known as successive waves. A small reserve is usually retained to follow the squadron in the attack.

c. The assault.—(1) The most serious threat to combat cars in the asault is the hostile antitank weapons. If they are on the ground, their fire is accurate. Supporting mortars, however, will endeavor to neutralize this hostile antitank fire by smoke. The combat cars may also take an oblique direction of approach at speed, thus forcing the hostile antitank gunners to traverse their weapons hastily with probable loss of accuracy.

(2) Prior to any attack, a reconnaissance is made and a definite, though brief, plan conceived. This plan must consider the—

(*a*) Approach.
(*b*) Line of departure.
(*c*) Hostile position.
(*d*) Attack formation.
(*e*) Rallying point.

(3) The attack having been launched, control is effected through observation of the leader by subordinate commanders.

(4) As the hostile position is reached, commanders' cars are absorbed by the assault echelon. Troop commanders drop back to a position in rear of the attacking waves where they can

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observe and employ their support to the best advantage. Similarly, the squadron commander should take advantage of cover to proceed slowly and observe the progress of the attack, using his reserve as is demanded by the situation. Normally he proceeds to the designated assembly area.

d. Time element.—Because mechanized forces operate at speed, the time element is important. The commander's plan must be made quickly. It must be flexible and brief and must tolerate the possibility of alternate plans becoming necessary.

e. Dispersion.—The combat car element must guard against dispersion.

f. Supporting elements.—All elements supporting combat cars must possess cross-country ability and must be capable of placing themselves in such a position as to offer the maximum amount of support to the combat cars in the minimum amount of time as the cars close in the attack.

g. Attack by waves.—Against an enemy whose flanks cannot be turned, an attack by successive waves may be launched to break the hostile line. When the breach is made, it is widened by successive elements, while those in front proceed to the attack of rear installations. Such an attack formation in depth permits some latitude of maneuver to succeeding elements and assures support to those elements engaging the hostile rear installations.

h. Attack in line.—Against a sparsely held hostile line, an extended line of combat cars may be used, followed by a small reserve. Such employment develops the hostile strong points in the minimum of time and enables the unengaged cars of the forward line to help eradicate and crush them. The reserve is held in hand and ready to attack in whatever direction necessity may dictate.

i. Attack in echelon.—(1) Attack in echelon enables the combat car command to strike a hostile position obliquely to its normal front with all elements closing together, thus promoting cohesion.

(2) Frontal attacks are normally avoided inasmuch as the inherent mobility of combat car units permits attacks on the flanks or in favorable cases even on the hostile rear. The attack must be organized in both front and depth. Each platoon covers a front of from 150 to 300 yards.

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j. Approach march.—For the approach march of the combat car platoon, column is ordinarily a suitable formation. For that of the larger units, a line of columns is appropriate. A preliminary reconnaissance having been made, and the direction of attack, objective, limit of attack, and assembly position having been designated in orders, the attack is launched. Troops are led by commanders over routes, taking advantage of terrain features insofar as practicable without deviating too greatly from the designated direction.

k. The assembly.—(1) In assembling, full advantage must be taken of cover. Cohesion must be quickly reestablished for the subsequent thrust that may be ordered. Advantage is taken of natural cover and of any cover afforded by remaining smoke.

(2) The combat cars must be on the alert to facilitate the advance of attached machine-gun elements, protecting the latter from hostile counterattack and thus enabling them to mop up and secure the objective with a minimum of hostile interference.

l. Attack by fire.—When combat cars launch an attack by fire from suitably placed vehicles, the suddenness with which a fire attack is made is a most important factor. Care must be taken to see that a line of withdrawal is kept open.

92. Defensive action.—Since the combat car is essentially an offensive weapon, its employment in defensive action will develop into a series of offensive maneuvers.

a. Method of assault.—Assault by fire to force enemy deployment and quick raids against hostile rear installations will be the method normally employed. Assaults will also be made to relieve pressure against our defending lines. Although the action of the force to which the combat car element belongs is defensive, the action of the cars themselves is offensive.

b. Supporting elements.—Here again the combat car elements must have some assistance from reconnaissance elements, support by fire from machine-gun elements, and hostile antitank weapon neutralization by the supporting element. The supporting mortars may also aid the combat cars in breaking off an engagement by laying smoke in such a manner as to facilitate their withdrawal. While the reconnaissance element may be small compared to that employed with combat cars in the offen-

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sive, the machine-gun element should be materially increased, for the machine guns must support the combat car attacks and also furnish protection behind which the cars may withdraw to re-form and reorganize preparatory to making another attack against the opposing forces.

93. Night operations.—*a. General effectiveness.*—Darkness reduces the effectiveness of the combat car. Its fire power, due to lack of visibility, is decreased. Mobility for the same reason is reduced. Protection of the crew by armor is the same as by day and, since hostile visibility is reduced, the crews are less likely at night to become casualties from fire than by day. Crushing power and shock are not impaired by darkness once the objective is gained.

b. In rear areas.—(1) These are the operations that are most handicapped by darkness. Marches on roads are made habitually without lights with the attendant reduction of speed. Surprise and road obstructions must be guarded against. Cross-country difficulties are increased. Careful reconnaissance should be made if a night operation is to be successful. Prominent landmarks must be carefully noted and remembered. A knowledge of the roads and trails of the area is desirable. Routes should actually be marked on the ground by white cloth on bushes, stakes painted with luminous paint on one side, etc. Guides may be sent out dismounted to establish control points. Column formations are recommended for the conduct of cross-country marches of small units at night. Such formations make it necessary for only the leading car to find its way with the others closely following. In the case of squadrons and larger units, parallel columns are used when the situation and terrain permit.

(2) If vehicles are moving to a jump-off position, the march should be carefully planned and coordinated so that the attack may be made without delay and full advantage may be taken of the concealment of movement afforded by darkness.

(3) In closing in the attack, lights may be used as the hostile position is reached, for otherwise losses in vehicles will be heavy in the ensuing mêlée. By turning on lights in the actual assault, danger of collision is averted and obstacles in the position, both natural and artificial, are avoided. When leaving the hostile position to proceed to the rallying point or to undertake further

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operations against hostile rear installations, lights will be extinguished until the next point of actual contact is reached. Colored flares dropped from planes or launched from ground projectors may be used to indicate hostile strong points, artillery, reserves, and other installations.

SECTION VI

MACHINE-GUN SQUAD AND SECTION

94. Dismounted action.—The method by which the squad goes into dismounted action has been described in paragraph 34*g*. The section, if employed by itself, would also follow those methods.

95. Mounted action.—When the section is engaged in mounted action as a part of the platoon, it is controlled by the section sergeant acting under the direction of the platoon leader. While mounted action is not normal (except in rear guard formations) for the machine-gun troop, the section as a tactical subdivision of the platoon must be prepared to carry out the missions assigned by the platoon commander. At no time, however, during this type of action should the platoon become widely dispersed. Consequently, the conduct of the section is mainly one of fire control and interior discipline.

96. Combat missions.—*a. Advance guard.*—When the machine-gun troop is employed as the advance guard for the regiment, a section may act as the advance party. The point will consist of two motorcyclists attached from other elements of the troop. The section should march several minutes ahead of the support. Its functions are similar to those of the advance party in a horse cavalry advance guard. It should be prepared to act immediately against the enemy upon information from the point. It should prevent small enemy parties from getting between it and the support. If the enemy is encountered in strength, the section should occupy a position that will be of importance and value to the main body later in the combat. Whether or not the section should go into mounted or dismounted action depends entirely upon the tactical situation. For small dismounted enemy groups encountered along the road, mounted action could be employed, but for large enemy groups in prepared positions or advancing dismounted across country or on a road, dismounted action should be employed.

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The advance party usually advances by bounds from one control point to the next, maintaining contact with the support by means of radio or motorcycle messenger.

b. Rear guard.—When the section is a part of the rear guard, it acts as the rear party. Its distance from the support depends largely on the terrain but should not be more than one mile. The rear point consists of two motorcyclists from other elements of the troop. In rear guard action, the section should usually employ mounted action to delay the enemy. In all other respects, its employment in tactical situations is similar to that of machine guns in horse cavalry units.

c. Reconnaissance.—In special situations, the section may be detached as a reconnaissance unit to ascertain enemy positions, flanks, lines of resistance, or to determine or discover information of value to our advancing elements. In this case, it must be prepared to meet hostile elements and break its way through to accomplish its mission. In a mission of this type, a rifle squad should accompany the section in order that it can perform missions of patrolling, scouting, and security as outlined in CFM, volume I.

d. Outpost.—When assigned to outpost duty, the section or squad follows the principles laid down for the platoon in paragraph 102 *b* (2).

97. Supply.—The section is entirely dependent upon its platoon headquarters for supply. The section sergeant is responsible for maintaining contact with his platoon headquarters.

98. Communication.—The section may receive messages from the platoon by means of motorcycle, flags, whistle, dismounted runner, and other visual signals. It can send a message by means of whistle, visual signal, and runner.

SECTION VII

MACHINE-GUN PLATOON

99. Armament and organization.—These are described in detail in section IV, chapter 2.

100. Characteristics.—*a.* The outstanding characteristics of a mechanized machine-gun platoon are great mobility and flexibility combined with heavy fire power. Its carriers are able to negotiate extremely rough country and approach very near to

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any desirable dismounted position and then retire via sheltered routes to positions of safety until recalled for further movement.

b. In mounted action, accuracy of fire is necessarily lessened but a great volume of fire can be spread over disputed terrain either frontally or laterally as the advance progresses.

c. Halted action, mounted, will have frequent uses, such as in delaying actions, surprise during reconnaissance missions, and even during offensive combat. Such action is important in that it permits fire without loss of time in dismounting and mounting. The platoon commander employing such fire action must keep in mind the vulnerability of his vehicles, use skillfully all available cover, time his stay at one position, and select in advance his avenue of withdrawal.

d. A feature of the armament which provides vehicle guns in addition to the guns normally used on the ground is a precaution against a surprise attack on the parked vehicles, either from the ground or air.

101. Methods of attack.—*a.* Though primarily intended for dismounted action on its own stable tripod, the Browning air-cooled gun is capable of effective fire from the post mount fixed to the vehicle. Thus the machine-gun unit can make a fire attack while in motion. Such fire would have its effect while traveling across country, though its most probable use would come in case of surprise on a highway. A machine-gun unit, caught mounted, is still able to fire while it speeds to a more favorable position.

b. Where it is reasonably certain that there are no antitank weapons, machine-gun carriers with their gun crews can circle a village at fair speed while firing to the flank and be reasonably safe from enemy fire. Together with the idea of halted action mounted, mentioned in paragraph 100 *c*, this forms the basis of mounted action by a machine-gun squad or platoon. While occasions for its use in a deliberately prepared action will be rare, possibilities exist for its use in hastily prepared or sudden action on the road.

102. Combat missions.—*a.* Acting as a combat unit of the machine-gun troop, the platoon will be called upon to carry out such missions as the following:

(1) As a pivot of maneuver covering the advance or reorganization of other units.

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(2) Holding or organizing ground already gained.

(3) Exploitation of success.

b. Since any of the above missions involve other units of the troop, a discussion of platoon tactics is better limited to platoon missions. Among such missions the following are invariably found predominating:

(1) *Acting as advance guard.*—(*a*) Acting as advance guard for a mechanized cavalry regiment or other similar unit, one or more platoons of machine guns are frequently used as an emergency advance guard when for any reason the original advance guard leaves the axis of movement. When this occasion arises the platoon gains its distance of at least 10 minutes at increased speed. It normally sends forward as an advance party one section with two attached motorcycles. The remaining section will constitute the support. When equipped with a radio command car, the position of the platoon commander is fixed with his radio car. When not so equipped, he can as readily be with his advance party, since communication will depend on motorcycle messengers and signal flags. In either case the advance guard as a whole must proceed by bounds from one control point to the next, which control points have been designated in the regimental march order. The advance guard commander will find it necessary to designate intermediate control points on which the march of his own advance party can be regulated.

(*b*) Flank patrolling other than a hasty reconnaissance of intersecting roads by motorcyclists is impracticable for the advance guard. Hence the advance guard confines its reconnaissance to the axis of movement and such road intersections as the situation and time permit. It will invariably establish a march outpost during halts, and at such times a deeper penetration to either flank by an observation unit is justifiable.

(*c*) Upon encountering small hostile patrols its normal action will be fire and movement; that is, mounted action. Dismounted action should not be undertaken unless the hostile strength compels it. When this situation exists the normal procedure might include a pivot of maneuver of the advance party (one section) and a maneuvering movement by the support to determine the extent of the enemy lines. If the enemy is too strong to be dislodged, this information should be passed

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at once to the main body commander and a dismounted position taken up.

(2) *Acting as an outpost.*—This mission may be assigned to a machine-gun platoon at an overnight halt. The basic principles governing are those laid down in CFM, volume I, with the following modifications:

(*a*) Guns will be in dismounted positions covering all avenues of approach.

(*b*) Guns will be mutually supporting.

(*c*) Personnel and vehicles are as close to the line of resistance as available cover will allow.

(*d*) Normally all available guns will be on the line of resistance.

(*e*) Patrolling between elements of the outpost is continuous.

(3) *Acting as a rear guard.*—The general formation of advance guard, reversed, will apply, with the following modifications:

(*a*) Distances from main body will be much less, due to the mobility of the latter.

(*b*) Communication must be definite and accurate.

(*c*) Sections will ordinarily be leap-frogged to the rear, one section covering the withdrawal of the other.

(4) *On a reconnaissance mission.*—In conformity with such a mission, a fight will be resorted to only when necessary to secure the information needed or to get back with the information obtained. Consequently, deliberately prepared actions will be rare, and hasty action, usually a running fire fight, will be the rule. The formation adopted by a platoon of 5 personnel carriers and one or two motorcycles will be similar to that of a mounted patrol by horse cavalry. The leader should be somewhat in advance of his two sections, with the cars of each section echeloned 50 to 100 yards on one another. On the advance into hostile or unknown territory, at least two motorcyclists should accompany the command car, one of which will be reconnoitering 500 to 1,000 yards ahead, while the other is in reserve.

103. Dismounted action.—*a.* At the command ***Action front (right) (left),*** the platoon leader indicates, with outspread arms, the line on which the guns go into position. Without further instructions, each section sergeant and corporal then

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causes his gun squads to set up guns on that line, taking up the formation that secures the maximum amount of cover for the gun and crew consistent with their mission. (See fig. 43.)

b. Firing data are given first by the platoon leader and then by the section sergeant and repeated by No. 1 gunners. The firing line may be advanced either by section or by squads of two guns. The normal procedure is to advance by squad, covered by increased fire from the two guns of the other squad of the section. If the advance be for a considerable distance, this is accomplished by the commands: 1. ***Out of action,*** 2. ***MARCH ORDER.*** If only for a short distance, 1. ***Out of action,*** 2. ***FORWARD TO THAT POINT*** will suffice. Fire is reopened as soon as the new position is reached to cover the advance of the other squad.

c. During the approach march to a position, any attached riflemen are employed as scouts some distance in advance of the squad or section columns. When fire has been opened from a given line or group of positions, they retire to the flank or flanks to act as combat patrols. This is especially important when one or two platoons are acting alone and have one flank exposed to hostile movement or the terrain lends itself to hostile infiltration and surprise.

d. The caliber .50 guns are only dismounted and used when specially ordered by the platoon leader. They are used primarily against enemy mechanization.

e. While the platoon is moving into a dismounted position, either deliberately or hastily prepared, the carriers, manned by the drivers under one designated man (usually the driver of the platoon leader's car), are conducted to cover in rear of the firing line or to one flank and slightly in rear of the position. Maintenance of contact with the firing line devolves upon this driver and, should the line move too far off, he selects a new position closer to the firing line and protected from sight and hostile fire. He details certain individuals to act as a message chain for communication between parked vehicles and the firing line, and to arrange for close-in defense of vehicles in some such manner as shown in figure 44.

f. Figure 43 shows the platoon using four caliber .30 machine guns and two caliber .50 machine guns. If eight caliber .30 machine guns are used, each of the two sections has the same

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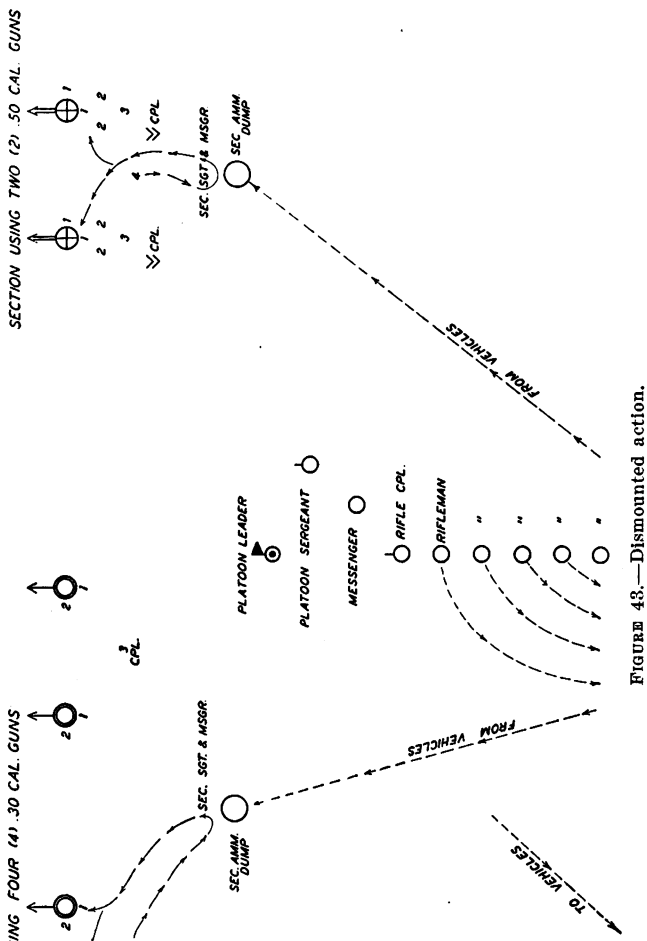

FIGURE 43.—Dismounted action.

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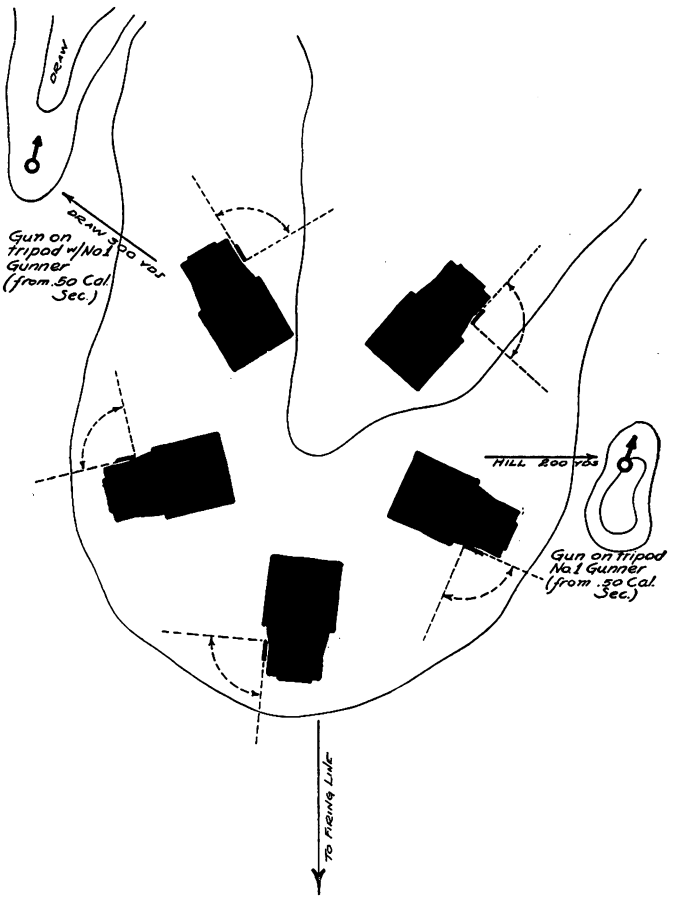

FIGURE 44.—Parked vehicles during dismounted action.

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ground layout as shown for one section. If four caliber .50 machine guns are used, each of the two sections has the same ground layout as shown for one section.

104. Mounted action.—*a.* Designation of objective, assembly point, formation of vehicles, etc., being understood, mounted action is launched on a prearranged signal.

b. The duties of individuals in each platoon are as follows:

(1) *Platoon commander.*—He observes the situation and leads his platoon.

(2) *Platoon sergeant.*—He assists the platoon leader by observing formation of vehicles, fire effects as shown by bursts, and by correcting (by signal) any vehicle out of formation.

(3) *Section sergeant.*—He observes the course of his vehicles, seeing that they follow that of the platoon commander unless otherwise signalled; signals his gun corporals the exact time to open fire and to cease firing; and observes fire effect. He reports casualties or damage to vehicle or gun as soon as assembly point is reached.

(4) *Gun corporal.*—He is in direct charge of two gun crews, only one of which normally will be engaged in mounted action at any one time. Prior to launching the attack, he will assure himself that the guns to be used are functioning, that his gunners understand the approximate location of the targets, and that sufficient ammunition is on hand.

105. Supply.—*a.* The section sergeant, prior to the parking of the empty carriers, makes a quick estimate of the situation and designates the number of rounds he expects to be fired. He then causes a section dump to be established in rear of the firing position. It will be the duties of his No. 5's to supply the guns from this dump.

b. The platoon sergeant arranges for a platoon dump (which may be at the vehicles) and for attached riflemen (when not otherwise used on flanking missions or as scouts) to carry ammunition and other supplies between the platoon dump and the section dumps. In the absence of riflemen for this purpose, car drivers will be used.

106. Communication.—*a. Within the platoon.*—This will be almost entirely by flag and arm signals. Each section sergeant maintains visual contact with the platoon leader or platoon

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sergeant and so places himself or a member of his section to insure contact.

b. With higher units.—When mounted, communication with other units is by motorcycle messenger, signal flags, or radio, depending on conditions. When in dismounted position, a runner or motorcycle messenger or signal flags are normally used.

SECTION VIII

MACHINE-GUN TROOP

107. Offensive action.—*a.* In attack, the regimental machine-gun troop supports the combat car elements by its fire, by constituting the secondary attack, or by performing certain defensive missions such as covering an exposed flank or covering ground unsuitable for combat car maneuvers but over which hostile attack may be expected. One or more machine-gun platoons may be attached to a combat car squadron. These machine-gun elements may support by fire alone or follow through after the combat car elements to occupy and organize the ground gained by the combat cars, to cover the reorganization of the combat cars, or, if necessary, their withdrawal.

b. After the assault of the combat car element is launched, the supporting fire of the machine-gun troop is eventually masked. The platoons are displaced forward, closely following the assault waves so as to allow the enemy no opportunity for counterattack prior to the consolidation of the position. The dismounted machine-gun platoons are so disposed as to lend mutual support to one another. The rifle platoon is placed to furnish flank protection or guard against isolated enemy groups. Machine guns advance deployed and prepared to fire mounted since they may normally expect to meet some disorganized resistance that has been passed over by the combat cars. The mopping up process may be left largely with the rifle platoon.

c. The order for the troop to displace forward is actually given by the troop commander, although the time of the displacement forward is decided by the regimental or squadron commander in command.

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108. Defensive action.—*a.* In active defense, the framework of the defense consists of the machine-gun elements and the rifle platoon. These are usually disposed mutually supporting on a wide front with little depth. They are sited with relatively long fields of fire to cover the best available ground for combat car counterattacks either by penetration or envelopment. Normally, the machine-gun troop can cover about 1,200 yards. In open, rolling country this might be increased.

b. In passive defense, the machine-gun platoons and the rifle platoon form the framework of the defense.

c. In defense against mechanization, a system of wide and deep deployment of the caliber .50 guns mutually supporting one another is followed.

109. Security.—In advance guards and rear guards, the entire troop is seldom employed. Platoons are detached and assigned to support combat car units.

110. Rifle platoon.—The rifle platoon exercises the usual tactical functions of the cavalry rifle platoon.

111. Control.—The regimental commander maintains communication with the troop by means of radio and motorcycle messengers. Each platoon also has motorcycles.

112. Employment.—Care must be taken that the power of the machine-gun troop is not wasted on piecemeal assignments.

SECTION IX

MORTAR PLATOON

113. Mission.—Hostile antitank weapons properly disposed are capable of delivering destructive fire against mechanized attacks which are under observation over considerable stretches of open terrain. To meet this threat by denying observation to the enemy, there is included as an organic part of the mechanized regiment a highly mobile and flexible mortar of large caliber, capable of projecting smoke material sufficient to blind enemy observation. The primary mission of these mortars is to blind enemy observation and antitank guns with smoke whenever movement of combat elements is threatened. Hostile antitank weapons constitute the greatest menace to mechanization, and a smoke screen which interferes with the well-aimed fire

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of the hostile antitank gunners on advancing assault echelons constitutes an efficient defense against hostile antitank weapons.

114. Weapon.—The 4.2-inch mortar carriage, T–5, has excellent cross-country mobility at slow speeds. Nevertheless, it cannot be expected to follow in trace of track vehicles without excessive loss of distance.

115. Shell fillings.—*a.* For peacetime training, on account of greater safety for firing personnel and the dangerous and destructive incendiary properties of white phosphorus, the chemical agent most widely used in smoke shell is FS, a mixture of chlorsulphonic acid and sulphur trioxide. In war white phosphorus is doubly valuable as a smoke agent, because in addition to greater smoke producing capacity, it has a tremendous casualty producing effect on personnel caused by its violent incendiary action.

b. In order to force masking of the enemy and to further harass and hinder him in the manipulation of his weapons, a certain percentage of tear gas, CN, should be included in all smoke screens. There will be some effect on friendly attacking troops, but this will be relatively slight in mechanized cavalry, due to speed of vehicles moving through the contaminated area.

c. The use in war of chemical agents other than white phosphorus or tear gas will be rare, as situations requiring the projection of mustard gas or phosgene will seldom occur with mechanized troops. Smoke shell with a small percentage of tear gas in the ammunition compartments of the mortar carriages should never be replaced by other ammunition, even temporarily, because the mortar mission demands that these weapons be prepared to establish and maintain smoke screens at any time.

116. Smoke screens and blankets.—*a.* The tactical uses of smoke for arms other than mechanized cavalry are discussed in chapter 8, BFM, volume I.

b. Speed is the watchword of the mortars of the mechanized regiment; speed in occupation of a position, accurate observation coupled with rapid and positive means of fire control, and speed in going out of action to escape hostile retaliatory fire; all must characterize mechanized cavalry mortar action.

c. To begin the adjustment of mortars, an initial salvo should be fired from the leeward flank with firing data calculated as accurately as possible. This salvo serves two purposes; it sets

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base plates firmly and indicates corrections necessary in firing data. A verifying salvo should then be fired with corrected data, and, if satisfactory, the screen is then established by firing five rounds without time interval from all mortars. With a dense obscuring screen established, the method of fire is changed to maintain a screen at obscuring density without wasting ammunition. In a calm, the screen may be maintained by firing all mortars every 30 or 40 seconds. For firing with head or tail winds blowing, the time interval must be shortened as the velocity of the wind increases. For flank winds, one section firing at long intervals, or the windward mortar firing at frequent intervals, may be able to maintain the screen with an economical expenditure of ammunition. Constant practice in control of fire is necessary to insure an effective screen during the desired periods. To summarize, each firing problem may be considered in three phases: first, the adjustment phase, during which mortars are laid on the target and wind effect is observed; second, the placing of a large number of shell on the target in a short period to establish the screen quickly; and, finally, the maintenance of the screen as long as necessary with the minimum expenditure of ammunition.

117. Observation and fire control.—Accurate observation of shell impact area and rapid means of transmitting fire-control data are essential factors in laying an obscuring smoke screen on a target for any given period. The mortar officer must adjust the fire of six mortars quickly and accurately before observation is blotted out by his own smoke. The variable factors affecting smoke clouds which can only be determined by observation of the impact area are wind velocity and direction. By observation, it will often be possible to determine that one section firing on the windward flank of the target can screen a target which would require all six mortars firing in a head or tail wind. Allowing for time for flight of the shell and the time required for the smoke material to burn, a desired effect will be obtained approximately two minutes after firing and will be maintained for the same period after firing has ceased. In mechanized attacks, after establishing an obscuring screen, the mortar officer must calculate the speed of the attack from observation and must cease firing at such time that when the leading elements of the attacking force are close enough to the

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enemy position for effective machine-gun fire, the screen or blanket of smoke has begun to dissipate. If mortar fire is continued until combat cars close with the enemy, the smoke will cause confusion in the attacking force and, by lowering visibility, will lessen effectiveness of machine-gun fire from combat cars.

118. Communication.—*a.* Communication between the observation post and the mortar position must be rapid and reliable. The simplest and easiest means is radio, using portable short wave transceivers. These sets are reliable within the range limit desired, normally less than 1,500 yards.

b. The alternative means is the use of field telephones with wire laid from a breast reel. This method requires time to lay and reel up wire, which often cannot be allowed. In this case, a mortar position must be selected close enough to the observation post for transmittal of firing data by voice.

c. It is not feasible to employ either messengers or signals to control the fire of six mortars, as messengers are entirely too slow for this purpose.

119. Coordination.—When the regimental commander issues the attack order, he prescribes the measures to be taken to coordinate the smoke screen with the attack. He may direct that the screen be established as soon as mortars are in position, at the same time informing squadron commanders that the attack will be launched as soon as smoke is laid. In situations calling for the attack to be launched at a certain time, the mortar officer regulates the screen to cover the target during the critical period. When the regimental commander does not wish to issue the final attack order, he may direct that combat elements take an assembly position prepared to attack on his order. In this case mortars are laid and, upon receipt of the order for the attack to be launched, the screen is placed. In any case squadron commanders will not ordinarily expose their squadrons in the open until an obscuring screen is placed by the mortars. As the extent of the smoke screens should be visible from assembly areas of combat car squadrons, there should be little difficulty in deciding the moment to launch the attack.

120. Reconnaissance, selection, and occupation of positions.—*a.* Having been assigned a smoke mission in a combat situation, the mortar officer is confronted with the problem of

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selecting and occupying a position without delay. Accompanied by the reconnaissance sergeant and the driver of the command car, he proceeds to select a defiladed firing position close to the route of march with the target well within range of the mortars. This position should not be so far to a flank that it is vulnerable; usually a position can be selected some distance in rear of the supporting ground machine guns, which will afford the necessary security. The mortar officer indicates the selected position and the target to the reconnaissance sergeant who sets the aiming stakes on the line mortar-target. The observation post is then selected and the driver directed to establish communication, either by radio or telephone, with the mortar position. In the meantime the motorcycle messenger has been dispatched to the platoon sergeant who remained with the platoon in the column or the forward assembly area with instructions to lead the platoon to the mortar position. The reconnaissance sergeant, having set the aiming stakes, meets the platoon sergeant and shows him the firing position and the aiming stakes. The platoon sergeant directs section sergeants to go into action on the indicated lines. The motorcycle messenger assists in establishing communication with the observation post and remains at the firing position as radio or telephone operator. The mortar officer and the reconnaissance sergeant proceed to the observation post and compute firing data. When the platoon sergeant reports all mortars in order, the firing data are transmitted and the fire is controlled by the mortar officer from the observation post.

b. If the situation demands hasty action, mortars may be laid by aiming vehicles at assigned targets by means of the aiming rods. Obviously, vehicles will be more exposed in these open positions and casualties are likely to result. Full advantage must be taken of low brush and slight folds in the ground to break up the outline of the mortar carriages when mortars must be emplaced for direct fire. Some protection is offered by driving vehicles up a reverse slope just far enough to sight with the aiming rods over the crest. Aiming stakes may be modified by installing a swivel socket in the center of each stake. To use these it is only necessary to drive one stake for each mortar just below the crest on the reverse slope. On top of each of these stakes is set another stake equipped with a

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socket. This horizontal stake is then turned until it points at that portion of the target on which its mortar is to fire. Mortar carriages are able to drive on the line indicated by these short stakes with accuracy. Time of setting stakes may still further be reduced by setting a stake for the center mortar only of each section. The flank cars in each section drive into position after the center mortar carriage is placed, angling off so that lines of sight of these cars diverge from that of the center car by ten° (180 mils). At 1,500 yards range, for example, the section would be covering over 500 yards of front. After the initial salvo, individual pieces may be adjusted if they are too far off the target.

c. An alternate position must always be selected so that after any action the platoon may be rapidly moved to escape hostile artillery fire.

121. Attachment of sections.—Whenever squadrons are given combat missions requiring operation at some distance from the remainder of the regiment, supporting machine guns with one section of mortars are normally attached in order to permit independent efficient combat operation by the detached squadrons. If one squadron only is detached from the regiment, one mortar section, under its section sergeant, may be attached to the squadron. The remainder of the platoon is then retained under regimental control. If both squadrons are given missions requiring attachment of supporting weapons, the platoon, less one section, may be attached to one squadron with the remaining section attached to the other squadron. Section sergeants operating with detached squadrons have no means of communication and no separate command vehicles. Consequently, they must be always on the alert to keep themselves informed as to the situation. Section sergeants must exercise their own judgment in selecting proper targets and laying screens at the times desired. Insofar as practicable, in all section actions, procedure conforms to that of the platoon. Without radio or telephone communication within the section, the section position must always be selected so that the observation post is within voice range of the firing position in order to permit fire control. With fewer facilities, the section must function covering the squadron in action as the platoon functions covering the regiment.

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122. Ammunition supply.—*a.* The compartments of each mortar carriage have space for 46 rounds of shell, making a total of 276 rounds for the platoon, carried on mortar carriages. As replacement of expended ammunition will always be uncertain, it must be conserved in every action. The supply of shell carried in the ammunition compartments of the mortar carriages is sufficient to place three separate 5-minute screens on an enemy position 1,200 yards long under unfavorable wind conditions. It should seldom be necessary to maintain a screen for longer than 5 minutes because this period gives ample time for combat car squadrons to leave covered assembly positions well out of effective range of enemy antitank guns, traverse open terrain under cover of smoke, and make the final attack on the enemy position as the smoke cloud begins to dissipate.

b. After each action, the first opportunity must be taken to replenish ammunition supply. Trucks from the combat train should be sent as far forward as possible to reduce the time mortars are out of action while refilling with ammunition.

SECTION X

COMMUNICATION PLATOON

123. General.—*a.* Command of a mechanized unit can be exercised to the fullest possible degree only when an adequate, well organized, and efficient system of signal communication is available to the commander.

b. Mobility tends to introduce a considerable degree of dispersion between units with resultant difficulty of control. In sustained action, dispersion may increase, which precludes the use of some of the generally accepted means of signal communication and requires modifications, particularly speeding up, of those agencies which are adaptable.

124. Signal communication system.—*a. Responsibility.*—The commander of each tactical unit is responsible for the establishment of signal communication within his own unit and with certain other units in accordance with the provisions of AR 105–15.

b. Control.—(1) The commander of each tactical unit exercises control over the signal communication systems of his own

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and subordinate units to the extent necessary to assure coordination within the command and adjacent units.

(2) The unit commander normally exercises tactical control of signal communication through his plans and training officer (S–3) who verifies the plan for the employment of signal communication to see that it meets the needs of the tactical situation.

(3) Technical control is exercised through the communication officer who is responsible for details incident to the proper functioning of the unit signal communication system.

125. Signal communication required.—The operations of a mechanized cavalry regiment or brigade will frequently be so varied that it is difficult to prescribe any definite requirements. Certain arbitrary changes must be made in the accepted methods of operation of communication in mechanized cavalry. The following should be accepted merely as a general guide:

a. Long range communication (over 50 miles).—(1) Brigade commander to next superior.

(2) Brigade commander to brigade reconnaissance elements (air or ground).

(3) Brigade commander to regimental and artillery commanders.

(4) Regimental commanders to regimental reconnaissance (air or ground).

(5) Regimental commanders to motor maintenance.

(6) Reconnaissance troop commanders to their platoons and sections.

(7) Artillery reconnaissance (personnel accompanying ground reconnaissance units) to artillery commander.

b. Medium range communication (estimated as 50 miles maximum).—(1) Brigade commander to rear echelon.

(2) Regimental commanders to squadron commanders.

(3) Regimental commanders to trains.

(4) Artillery command.

(5) Artillery reconnaissance (air and ground).

c. Short range communication (estimated as 15 miles maximum).—(1) Regimental commanders to machine-gun and mortar commanders.

(2) Squadron commanders to troop commanders.

(3) Artillery commander to rear echelon.

(4) Battery fire control.

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d. Close-in communication (estimated as 3 miles maximum).—Troop commanders to platoon commanders, except reconnaissance troop.

126. Available agencies of signal communication.—Reliance is not placed solely upon any one means. If the principal agency fails, there is always available some supplementary means of signal communication.

a. Wire.—The combat characteristics of mechanized cavalry preclude the laying of wire, except for the mortar platoon and artillery component; however, full use should be made of commercial installations when operating in friendly territory. Mechanized artillery and the mortar platoons carry a limited supply of wire and are prepared to lay it if the situation indicates.

b. Sound signals.—In combat, sound signals, such as a burst of machine-gun fire or the sounding of the vehicle horn, may be used, but their application is very restricted, as they cannot be considered reliable signals.

c. Visual signals.—The use of visual signals is essential in mechanized units of the size of a troop and smaller. The restricted observation offered by the eye-slits of mechanized vehicles constitutes a definite limitation. Furthermore, to be reliable, a visual signal must be composed of the minimum number of elements, all of which must be displayed concurrently until acknowledged. Other factors operating to the detriment of good observation are dust, smoke, fog, darkness (except in the case of pyrotechnics or lights), terrain, and woods. The following methods of transmitting visual signals will be considered under the headings: pyrotechnics, flags, semaphores, and lights. Panels, while strictly a visual signal, will be discussed in *d* below.

(1) *Pyrotechnics.*—The objection to the general use of pyrotechnics is that only a very few meanings can be assigned. At present, there are only two general types of pyrotechnics available; the ground signal, discharged from projector MK1, and the position light.

(*a*) The ground signal, equipped with a 3.5 second delay fuze, rises to a height of some 400 feet before it ignites. The parachute signals burn for 25 seconds and the star cluster for 5 seconds. It is not suitable for use between small units separated

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by a few hundred yards, as it rises out of the line of vision before it ignites. It may be used between squadrons and regiment, or regiments and brigade, when separating distances do not exceed the range of visibility. Another objection is that to insure being seen by a unit located at some distance, it should be fired from a previously designated point. Frequently, this point cannot be definitely foreseen in a moving situation. Its use between ground troops is normally restricted to an emergency and as a supplementary signal from attacking troops to the artillery "to lift fire." It can be used from ground to plane, by previous arrangement, to acknowledge a signal or message.

(*b*) The use of position lights, other than from ground to plane, for identification of units is not practicable.

(2) *Flags.*—The use of hand flags (not semaphore or wigwag) is the most satisfactory visual signal for use in lower units. Four basic colors are used; red, white, blue, and yellow, and no signal requires the use of more than two flags. Squadron flags are approximately 16 by 18 inches, and the troop and platoon flags are approximately 14 by 16 inches. The handle is about 8 inches longer than the fly of the flag. They are displayed by hand, thrust up through the top of the turret.

(3) *Semaphores.*—This method of signaling has advantages in that it can be operated from the interior of the vehicle. The disadvantages are that the number of signals must be restricted and that the semaphore may be knocked off when traversing woods or shot away during combat.

(4) *Lights.*—Colored lights displayed outside and operated from the interior of the vehicle are used as a means of visual signaling between the smaller units. Green, red, and amber have good daylight visibility and when used separately and in combinations furnish seven positive signals.

d. Air-ground communication.—Frequently, observation aviation, and at times pursuit and attack aviation, will work in conjunction with mechanized units. Extensive joint training and continued liaison are most essential. Two-way radio is normally employed and the plane will operate on the frequency of the particular unit with which it is working. When radio fails, certain other methods are practicable; such as plane to ground—dropped message, pyrotechnics, or wing signals; ground to plane—panels, pick-up messages, or pyrotechnics.

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(1) *Panels.*—The regulation type AP panels are used for communication from stationary ground units to plane but are not practicable while the unit is moving. Improvised streamer panels 2½ feet wide by 6 feet long, in various readily discernible colors, are used for identifying moving units and to indicate to the plane where a message is to be dropped. If necessary to transmit a message by panels, the current air-ground liaison code is employed. If the unit is moving, the vehicle carrying the unit panels (usually the unit communication officer's vehicle) falls out, transmits his message, and regains position at the first opportunity. One or more motorcyclists remain with the communication officer to deliver messages to the unit commander.

(2) *Pyrotechnics.*—Planes utilize pyrotechnics to call for "identification" or "repeat," or as an "acknowledgment," employing them only when other means are not at hand. Stationary ground units may use the projector with ground signal or position lights.

(3) *Wing signals.*—"Zooming" and "rocking wings" are plane signals which are readily distinguishable by ground troops. "Waggling the tail" is sometimes difficult to detect unless the plane is directly overhead. "Blipping" or "gunning" the motor (sound signal) is very difficult to detect from a moving vehicle and practically impossible from a track vehicle.

(4) *Dropped messages.*—Frequent recourse to dropped messages will be had by cooperating aviation. Even when radio is functioning it may be desirable to drop a marked map or sketch. When dropping messages to a moving mechanized unit the plane calls for the display of identification and then drops the message pouch in the path of the identified vehicle and about 300 to 500 yards in advance.

(5) *Pick-up messages.*—Units the size of a mechanized squadron or larger are normally equipped to handle pick-up messages. Smaller units assigned to independent missions are also equipped prior to their departure.

e. Radio.—Radio is the means of signal communication which most closely approximates fulfillment of the need of mechanized units for a reliable and flexible agency. It is very fast and is independent of road conditions. The radiotelephone enables commanders to hold personal conversation with their subordinates and superiors.

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(1) *Practical considerations.*—The following considerations are of importance to all mechanized cavalry unit commanders down to include the car commander:

(*a*) In order that radio transmissions may be kept to the absolute minimum consistent with the proper dissemination of orders and information, commanders must give their subordinates all possible information and instruction prior to their assignment to a mission. Each subsequent contact should be utilized to acquaint them with developments in the situation.

(*b*) Practically all radio vehicles operate more efficiently when halted. If the command is not halted and if tactical considerations permit, the radio vehicle should pull to one side and halt in an advantageous location during the period of operation, then regain its position without unnecessary delay. All other factors being equal and a choice afforded, higher ground should be selected, particularly when distances approach the range limit of the set. The following locations should be avoided if possible:

1. Close proximity to another radio vehicle, if it is operating.
2. Very low ground.
3. Locations in the vicinity of commercial circuits, particularly power lines, factories, farms, or buildings where there are presumably motors or other electrical equipment.
4. High buildings, particularly those of metal construction.
5. Heavily wooded areas and, when wet, any trees or high bushes.

(*c*) Long distance operation will be facilitated if it is possible to halt and permit the operator to set up a larger antenna. The short fishpole antenna will operate most efficiently when vertical. It is pulled down, however, when traveling and all possible precautions should be taken to prevent damage to the antenna. The loss of a section of the antenna will materially impair the efficiency of the radio set. The operator is cautioned to pull down the antenna when traversing underpasses and particularly through the smaller towns where electric light and telephone wires or cables cross the road with low clearances.

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Drivers should also be instructed to turn out in order to avoid overhanging branches when this procedure does not interfere with traffic.

(*d*) Car commanders of radio equipped vehicles should know their unit call sign, wear headphones whenever practicable, and be sufficiently familiar with the principles of radio procedure, use of the microphone (for voice transmission), and the fundamental controls of the radio set so that they may operate by voice in an emergency. They should also be sufficiently familiar with the duties of the operator to know whether he is maintaining the proper records. They should inform the operator regarding the car commander's name, the name of the second in command, and the numerical and tactical designation of the unit (if any); that is, advance guard, patrol, reserve, etc.

(*e*) If vehicular trouble develops, or the radio fails to function properly, the car commander should not hesitate to transfer to another radio vehicle and take it over as his command vehicle. The old call is given to the new operator who is then instructed to take all calls for that station.

(*f*) To facilitate the transfer of radio sets from one vehicle to another when necessary and to reduce interference throughout the command, all vehicles in mechanized units should have—

1. Complete shielding and bonding.
2. Twelve-volt ignition systems, with 180 ampere-hour batteries (or larger) and 50 ampere generators.
3. Mounting brackets for radio set.

(2) *Disadvantages.*—(*a*) Radio has certain inherent disadvantages:

1. It is not secret.
2. It is subject to serious interruption by static.
3. It is capable of being disrupted by intentional interference from hostile stations or by unintentional interference from friendly stations failing to operate on their proper frequency.
4. A high degree of training is a prerequisite of operating and maintenance personnel.
5. Other radio sets operating in nearby vehicles may cause "blocking" of the receiver.

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(*b*) When radio is employed to furnish communication between moving vehicles, the above disadvantages are complicated and augmented as follows:

1. The operating range is greatly reduced due to the necessity of using a relatively inefficient antenna.
2. Serious interference is caused by the ignition system of the motor unless properly shielded. In the case of track vehicles, track static may be developed.
3. Unshielded motor vehicles in the vicinity produce additional interference.
4. Commercial power lines, cables, etc., along the road cause interference and fading.
5. The necessity for movement frequently precludes the selection of favorable locations with respect to terrain.
6. The swaying and pitching of the vehicle in cross-country work greatly increase the difficulties of the radio operator.
7. The equipment is frequently impaired by quantities of dust and moisture to which it is frequently subjected.
8. The limited space adds to the operator's problem.

(3) *Frequencies, nets, and call signs.*—The number of radio sets required to furnish the essential communication at any time and their grouping into nets to insure the most efficient operation will vary with the particular mission upon which the unit is engaged. Sets in sufficient numbers are provided to meet all normal needs but the number of active sets should be restricted to those absolutely necessary and the use of the radiotelephone should be limited to the most important transmissions.

(*a*) *Frequencies.*—Efficient operation demands that a radio set must operate on a definite frequency. (Frequency is expressed in kilocycles, abbreviated KCS.) It is essential that operators exercise great care in keeping their sets tuned to the specified frequency. There must be a certain separation between frequencies in order that sets on one frequency can operate without interfering with sets on an adjoining frequency. Theoretically, sets using continuous wave (CW) transmission can operate with a 20 KCS separation while sets using radio-

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telephone (voice) require a separation of 50 KCS to avoid interference. Therefore, in a band of 1,000 KCS there should be 21 voice channels or 51 CW channels. With present equipment, however, due to a certain lack of frequency stability, greater separation, particularly between voice channels, is necessary to obviate interference.

(*b*) *Nets.*—The radio sets of units which normally communicate with each other are grouped into one net, all sets in the net operating on the same frequency. The net control station (NCS) governs the operation of the other stations in the net. It is not desirable to assign the set in the command car of the mechanized brigade, regimental, or artillery commanders to act as the normal NCS, as the commander should be free to leave or enter any net at any time. However, that set automatically becomes NCS whenever it reports into any net which is under the direct control of the commander. The mission of the unit will determine the tactical dispositions which in turn indicate the number of nets needed. If available frequencies do not permit the desirable number of nets, two or more nets will be consolidated. The efficiency decreases rapidly after the number of stations in the net increases beyond six. It is possible to offset this loss of effectiveness somewhat by maintaining a rigid net discipline, using proper radio procedure, silencing certain of the less important stations, and finally, by suppressing all unimportant transmissions. Figure 45 is a diagrammatic representation of the usual maximum number of tactical radio nets which are required by a mechanized cavalry regiment. The diagram will change as the number of sets in the regiment changes. In addition to the twelve nets of the two mechanized cavalry regiments, a mechanized cavalry brigade may require—

Brigade command net.
Brigade reconnaissance net.
Brigade air-ground net.
Brigade administrative net.

The mechanized artillery component (assuming four batteries) may also need—

Artillery command net.
Four battery fire-control nets.
Liaison net.
Two air-ground nets.

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This does not include the nets in which ultra-high frequency sets may be used.

(*c*) *Call signs.*—The stations in a net are identified by call signs. These are groups of two letters (or two letters and a numeral) used to distinguish one station from another. Call signs are assigned by higher authority and are changed periodically to deceive hostile intelligence stations.

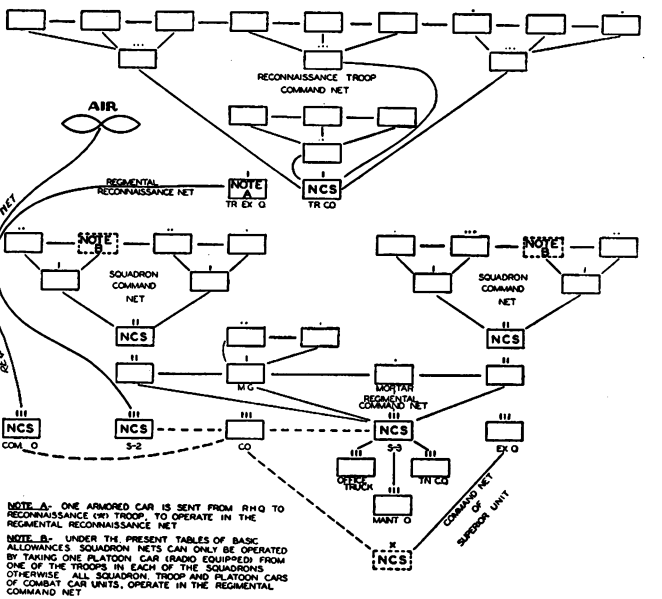

FIGURE 45.—Tactical radio nets (maximum net requirements, mechanized cavalry regiment).

f. Message centers.—(1) *Functions.*—(*a*) The principal functions of the message center in mechanized cavalry units are to—

1. Coordinate the use of the various means of signal communication.
2. Maintain accurate records of messages.
3. Handle cryptography when necessary.
4. Operate the messenger service.

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(*b*) The message center operates continuously during active operations under the control of the communication officer with the message center chief directly in charge.

(2) *Procedure for mechanized units.*—(*a*) In mechanized units, conditions vary to such an extent that major modifications in accepted message center procedure become necessary. When the command post is stationary, one type of message center procedure is applicable; when the unit is moving, the operating procedure is modified. For example, when the unit is moving, brigade S–3 may be operating in the command net, S–2 in the reconnaissance net, and the communication officer in the air-ground net. All of these staff officers who represent the commanding officer are functioning in separate radio nets and separate vehicles. Each must handle his own traffic, transmitting by motorcycle messengers such messages as are necessary to the commanding officer wherever he may be located at the time. It therefore follows that each of the above-named staff officers should have available for his immediate use one or more motorcycle messengers. In this particular case it is necessary for each of these staff officers to assume certain message center functions.

1. Selection of the means of signal communication to be used.

2. Maintenance of records of messages.

(*b*) A necessary violation of the normal message center procedure is in the matter of messages sent in clear. Regulations prescribe that all messages sent by radio be cryptographed unless the commanding officer (or his authorized representative) designates, over his signature, "Send in clear"; whereupon message center personnel (or radio personnel in the case of "simplified procedure") do the necessary cryptographing. In mechanized units, the large majority of messages are sent in the clear and, if crytographing is necessary, the originator does it.

(3) *Principles involved.*—(*a*) In mechanized units, no message center procedure is adaptable which will tend materially to slow up the transmission of messages or delay the operations of the unit.

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(*b*) Additional principles which govern the operation of message centers in mechanized units are as follows:

1. The best means of signal communication should be employed.
2. There should be a definite "follow up" of outgoing messages.
3. There should be a complete record of delivery.
4. Responsibility for the above should be fixed.

(*c*) In a moving situation the matter is comparatively simple. The staff officer concerned, having only one channel of radio, decides whether it or a motorcycle messenger is the best means, and is responsible for the "follow-up" and supervision of the maintenance of records of delivery. When the unit is halted and the command post established, the normal message center procedure should be approximated as closely as conditions permit.

(*d*) Since a large percentage of the traffic will be by radio, the operators incorporate the necessary basic information in their log books. However, in moving situations, the continuity of records cannot be maintained unless the responsible officers furnish the radio operator with copies of all messages. This not only includes the normal radio traffic but also messages sent by motorcycle messenger and radio messages transmitted (generally by voice) by the officer himself. Operators are instructed to copy the voice transmission of officers in their logs, but due to the swaying and pitching of the vehicles and the tendency of some officers to talk faster than the radio operator can copy, it is difficult to comply with these instructions.

(4) *Provisional procedure for mechanized units.*—(*a*) *Duties and responsibilities.*—The communication officer, commander of communication platoon, communication chief, or message center chief may handle the duties as outlined for the message center chief. The above personnel, by virtue of their work, training, and capabilities, are in the best position to know what means of signal communication is most expedient and effective at any particular time. However, any officer may, if it will expedite transmission, assume the duties as outlined for the message center chief at any time. When he does so, he also assumes all responsibilities of the message center chief and, therefore, must at the first opportunity report all messengers who have been

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dispatched, together with all pertinent data, to the message center chief. At the end of the day's business (midnight in extended operations), all logs and copies of messages are collected from radio operators by the communication chief and turned over to the communication officer. He in turn hands them to the unit S–3. Other staff officers turn over their retained copies directly to S–3.

(*b*) *Incoming (received) messages.*

1. Radio.—The radio operator copies, in duplicate, the incoming message on a message blank. He enters a serial number (from his operator's number sheet), time received, and the call letters of the transmitting station. In the station log he notes "time," "from," "to," and enters "NR —— rec'd" (filling in the number he has assigned to the message). He hands both copies to the addressee, if present; if not present, to the messenger (car driver) who takes them to the addressee. The addressee (or his representative) retains the original, and on the duplicate enters time and initials and hands back to messenger, who returns duplicate to operator. The radio operator then files it in the message pouch of his log book.

2. Messenger.—The messenger (generally motorcycle, except as indicated above) delivers the message directly to the addressee (or his representative), who keeps the original message, and on the message envelope (or delivery list or duplicate message) notes time, initials, and hands back to the messenger, who returns this receipt to the person who instructed the delivery of the message.

3. Dropped message.—All dropped messages are delivered to the commanding officer (or his staff representative), who is responsible for the document. Time of receipt and initials of recipient should be entered on the face of the message as a matter of record.

(*c*) *Outgoing messages.*—The originator writes the message in duplicate, encoding it if necessary.

1. Radio.—In a moving vehicle, the original message is handed to the operator while the duplicate is re-

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tained by the originator. If at a stationary command post, both copies are handed to the message center chief, who sends the original to the proper station for transmission, retaining the duplicate to follow-up and verify receipt. In either case the radio operator enters the proper serial number (from his operator's number sheet) on the message, together with the call letters of the station to which it is to be transmitted. He transmits the message, makes the proper entries in his log, together with the notation "NR —— sent," enters the time of acknowledgment at the bottom of the message, files in his message pouch, and notifies the originator or the message center chief that delivery was accomplished at —— (giving time). The message center chief enters the time acknowledged on the duplicate copy and returns it to the originator. If unable to transmit the message within a reasonably short time, operator notifies the message center chief to that effect, and the latter, if unable to accomplish expeditious delivery by some other means, requests instructions from the originator.

2. *By messenger.*—In a moving vehicle the originator calls up a motorcycle messenger, hands him the message (in a message envelope properly filled in), and gives him the necessary instructions regarding delivery. At a stationary command post the originator gives both copies to the message center chief who encloses the original in a message envelope and hands it to the selected messenger. He retains the duplicate as a follow-up until the messenger returns with the receipt. He then attaches the receipt to the duplicate and hands both to the originator.

(5) *Messengers.*—Messengers are indispensable to the efficient functioning of the signal communication system of mechanized units.

(*a*) Runners are used within the command post limits when units are halted. Staff officers, car drivers, or any other available personnel are used for this purpose.

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(*b*) Messengers in vehicles are used—

1. When motorcyclists are not available.

2. When the situation is such that more than one man should make the trip; that is, when the trip is extremely long and fatiguing, or when operating over unfavorable terrain or in hostile territory.

3. When subjected to hostile fire. In this case the use of an armored vehicle is indicated; otherwise it may be a passenger car, light truck, or impressed motor vehicle.

(*c*) Motorcycle messengers are the principal class of messengers used and are available in all units. They, together with radio, constitute the two principal means of signal communication in mechanized cavalry units. On narrow, sandy roads, or when roads are slippery, they are subjected to certain delays or accidents, but as a reliable and relatively fast means of signal communication they are indispensable. One of their very important duties on the march is the passing of messages from one staff car to another when these cars are not in the same radio net.

(*d*) Messengers must be given explicit instructions regarding delivery of messages. They should be told—

1. To whom to deliver the message.

2. Where to go.

3. Route to follow.

4. Rate of travel.

(*e*) Messengers wear red brassards on their left arm above the elbow and, if not equipped with a message pouch, carry their messages either in the upper left-hand coat pocket or the left-hand shirt pocket.

(*f*) In mechanized cavalry units it will seldom be practicable to operate scheduled messenger service except in bivouac. Special messengers will be the rule rather than the exception. Special messenger service tends toward the speedy dissipation of personnel and is very fatiguing; therefore care is exercised not to send motorcyclists on unnecessary trips. This provision should not be construed as a restriction when the situation indicates the use of double messengers to be desirable.

(*g*) Full use should be made of incoming messengers to return replies, etc., to the unit from which they came. Such a

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messenger should not be held unduly long for this purpose, otherwise the unit sending the message will be uncertain regarding its delivery, and that unit will be deprived of the use of its own messenger during the time of his absence. Such a messenger should never be diverted to another unit unless the latter is located on the return route, and the delay incident to the delivery of the message will be negligible. It should be noted that if such a messenger is utilized no acknowledgment of message delivery can be expected, as the messenger must be free to continue on to his own unit.

(6) *Codes and ciphers.*—(*a*) There are certain general rules which govern the use of codes and ciphers. Among them are the following:

1. Care should be exercised to prevent the loss or compromise of a code. If lost or possibly compromised, the fact should be reported immediately to higher headquarters.
2. The use of the particular code should be understood and coordinated by all employing it.
3. A message sent in code should never be repeated in clear, and vice versa. If repetition is necessary, the wording should be changed.
4. Never mix secret and clear text in the same message.

(*b*) The following practices have been developed in mechanized cavalry units in order to expedite transmissions:

1. It is assumed that all messages sent by radio will always be intercepted.
2. The originator (not the message center personnel or radio operator) is charged with the cryptographing of any message the contents of which are secret. The originator, invariably an officer or noncommissioned officer (generally the former), is authorized by the commanding officer to send in clear such messages as he deems to come under the provisions of paragraph 116, BFM, volume IV. His signature on the message, under the statement "Send in clear," constitutes the authorization "Send in clear." Radio operators are trained to transmit the message exactly as written.

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3. All information regarding hostile dispositions is normally sent in clear. The time gained by not cryptographing is far more important to the commander than is the fact that the enemy may have thus gained this relatively unimportant information. The tactical situation will indicate the exceptions.
4. For regulations governing signal communication and cryptographic security, see AR 335–5.
5. The division field code and individual cipher device (M–94) are carried by all units down to and including the squadron for use when operating in conjunction with other arms employing this code. For use within the regiment and in order to avoid compromising the current division field code, recourse may be had to special codes.
6. The current air-ground liaison code and fire control code (for artillery) are used for communication with cooperating aviation and in all other cases where their use will not greatly delay the transmission of messages.

(7) *Special codes.*—Special codes are employed to expedite the transmission of messages and for secrecy. Such special codes are simple and brief. Three types are normally used—special geographical code, special coordinate code, and special message code. Such codes are changed frequently.

127. Employment of signal communication personnel.—*a. Organization.*—The signal communication personnel of the mechanized brigade and regiments are organized into communication platoons normally under the command of a lieutenant.

(1) The platoon is organically a part of headquarters troop and, from the standpoint of administration, supply, discipline, and basic training, is under the immediate control of the troop commander.

(2) The technical and tactical employment of the platoon is controlled by the communication officer, who is directly responsible to the brigade (or regimental) commander.

b. Functions.—(1) The general function of the platoon is to handle the installation, operation, and maintenance of the signal communication system of the unit.

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(2) The personnel falls naturally into three groups, exclusive of the essential supervisory personnel:

(*a*) Message center personnel, including messengers.

(*b*) Operative personnel.

(*c*) Repair and maintenance personnel.

c. Employment.—Due to the fact that radio and messengers are the principal means of signal communication in mechanized units, the tactical employment of the communication personnel seldom varies. The operation of the message center and utilization of messages have been covered in paragraph 126 *f*.

(1) Radio operators from the communication platoon are assigned to operate the radio sets of the command.

(2) In addition to their basic assignment, the radio operators must also keep certain message center records and must be trained to function as assistant gunners if their vehicles actually become engaged in combat. In their capacity as radio operators, they must be highly trained technically, for they work with the minimum of technical supervision and they have no assistant operator to relieve them.

(3) The repair and maintenance personnel are employed under the instructions of the communication officer and the immediate direction of the communication chief. In major cases of failure the ideal method in the field and, if the command is moving, the only practical method, is by unit replacement.

d. Echelons of repair and maintenance.—The duties of the various echelons are furnished only as a guide. Further experience will indicate the necessary additions and changes.

(1) *First echelon.*—Operator—

(*a*) Replaces defective tubes.

(*b*) Replaces defective fuzes.

(*c*) Tightens external connections.

(*d*) Cleans set.

(*e*) Reports set failures and cases of malfunctioning.

(2) *Second echelon.*—Communication platoon; regiment—

(*a*) Tests tubes.

(*b*) Solders defective connections.

(*c*) Tests and replaces defective cords, plugs, head sets, microphones, and other auxiliary equipment.

(*d*) Tests and replaces dry batteries.

(*e*) Charges auxiliary storage batteries.

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(*f*) Cleans shielding.

(*g*) Replaces defective antenna bases.

(*h*) Replaces shock absorbers and snubbers.

(*i*) Tightens and replaces nuts, bolts, studs, etc.

(*j*) Tightens all internal connections.

(*k*) Cleans interior of set with blower.

(*l*) Coordinates with motor maintenance section regarding necessary repairs, replacements, and adjustments in connection with vehicular ignition system, to include—

1. Ignition wiring, shielding, and bonding.

2. Generator and cut-out relay.

3. Starting motor.

4. Distributor.

5. Coil.

6. Voltage regulator.

7. Spark plugs.

(*m*) Checks all connections and tests set whenever radio vehicle returns from shop (troop, regimental, quartermaster or ordnance).

(*n*) Makes weekly check of vehicular storage batteries to insure satisfactory radio operation.

(*o*) Makes monthly inspection of all sets.

(3) *Third echelon.*—Brigade radio repair section—

(*a*) Makes major repairs such as replacement of condensors, relays, transformers, jacks, tube sockets, etc.

(*b*) Repairs loud speakers.

(*c*) Alines receivers.

(*d*) Calibrates transmitters.

(*e*) Makes initial installations.

(*f*) Rewires sets when necessary.

(*g*) Makes quarterly inspection of radio equipment including complete check of filters, shielding, and bonding. Probe antenna to be used in connection with this check.

(*h*) Handles replacement of all defective signal equipment and accessories on certificates, thus eliminating inventory and inspection reports in all subordinate units.

128. Plans and orders.—*a. Paragraph 5 of field order.*—The reference to signal communication is normally included in the last paragraph of the field order. In a formal written field order this is paragraph 5.

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(1) In a complete order of one of the larger units, paragraph 5*a* refers to the signal communication annex or to the index of signal operation instructions; paragraph 5*b* announces the axes of signal communication; and paragraph 5*c* announces the command post of the unit and prescribes the locations of the next lower units.

(2) In the orders of mechanized cavalry units, it is seldom necessary to include all of the above details, although this information will vary with the situation. If the command was to move immediately, paragraph 5 might read:

> "Signal operation instructions No. 3 will govern.
> Messages to the head of the main body;"

or, if to move after a certain period of delay:

> "Signal plan 'B' will govern.
> Messages to Fort Knox until 9:00 a. m.; thereafter to the head of the column."

b. Signal operation instructions.—(1) Signal operation instructions are issued for the technical control and coordination of signal communication. They are prepared by the communication officer of the unit and are issued by authority of the unit commander. They are used principally in the higher units.

(2) Signal operation instructions for a contemplated tactical operation are generally issued in advance of the operation. They may remain in effect during the entire operation or cycle of operations. They are issued as separate items and the various items are changed as circumstances require, not necessarily at fixed intervals.

(3) Items with which mechanized units are particularly interested are the serials relating to call signs and frequencies.

c. Plans.—For mechanized units, there are a few type plans for the employment of radio which will fit certain given situations. To illustrate, one situation may require all stations in the unit to operate on one frequency; another situation may require a grouping of the radio sets into three tactical nets. There are other normal groupments. These plans of employment are indicated as plan "A," plan "B," plan "C," etc., and so announced in paragraph 5 of the field order. After the unit commander has announced his tactical plan or scheme of maneuver, the communication officer recommends the type plan best

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suited to meet the tactical needs. The unit commander informs his communication officer regarding his general tactical plan as early as possible.

d. Axes of signal communication.—The principles governing the selection of the various axes of signal communication for mechanized units do not vary from those employed in horse cavalry units.

e. Command posts.—(1) The factors governing the selection of command posts for mechanized cavalry units are similar to those pertaining to all combat units. In general, the location selected should favor—

(*a*) Control of subordinate units.

(*b*) Facility for signal communication; particularly locations favorable to radio operation and suitable routes for messengers.

(*c*) Concealment from hostile observation, both aerial and ground.

(*d*) Cover from hostile fire.

(*e*) Shelter.

(2) One individual in each command group is charged with the responsibility of disposing vehicles and personnel in locations affording the maximum concealment and dispersion consistent with the factors stated above. The location of the most important radio command vehicles should be favored.

(3) Command post locations should be published promptly to all concerned. Whenever the move can be anticipated, warning of a contemplated movement should be given in advance to superior and subordinate commanders and to the unit communication officer.

(4) When the command post moves, particularly during the periods immediately prior to, during, or immediately following combat, it is desirable that a guide be left at the old command post location for a reasonable time in order to direct messengers to the new command post.

SECTION XI

SERVICE TROOP

129. Duties.—*a.* The service troop is designed to furnish transportation for the mechanized cavalry regiment in the garrison and in the field. It also maintains a center for the

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care and maintenance of the regimental vehicles in the garrison and a collecting agency for salvage vehicles on the march. It maintains a mobile or semi-stationary repair center in the field. In the mechanized cavalry regiment the training and employment of the service troop personnel should be confined principally to the development of efficiency in their various technical functions.

b. The transportation platoon is responsible for maintaining and operating its equipment with a high state of efficiency at all times. It is necessary that its personnel should have ample training hours to devote to the care of equipment, the development of competent drivers, and practice in marching in convoys.

c. The maintenance platoon is a repair unit designed for regimental repair functions. It requires highly trained mechanics, dependable personnel, and the maximum number of training hours for technical training.

130. Transportation.—*a.* In garrison, the transportation platoon maintains a service park for the regimental vehicular equipment, a dispatch office, a pool for administrative passenger cars, first and second echelon maintenance for its own equipment, and a pool for truck transportation available to the regimental commander.

b. On the march the transportation platoon absorbs the troop train to form the regimental trains commanded by the service troop commander. When the regiment goes into camp the kitchens and baggage trucks may report to their respective troops while the remainder of the train forms a park under the direction of the transportation officer. In a tactical situation the trains are usually formed well in rear of the combat element, depending on the distance needed for security. On the road during a tactical situation the trains move at the designated rate of march, either at extended distances of about 50 to 100 yards between vehicles or by sections extended to greater distances.

131. Maintenance.—*a. In garrison.*—The maintenance platoon in the garrison performs regimental maintenance, maintains a shop through which the troops may obtain spare parts, maintains an inspection agency for vehicles of the regiment, and is a training center for the regimental mechanics. The maintenance platoon also maintains a motorcycle repair shop,

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a spare parts stock room, a machine shop, a paint shop, a battery and ignition shop, a blacksmith and welding shop, and an office. All the maintenance records of the regiment pass through the maintenance office where the regimental commander has available a complete history of costs of regimental repairs to vehicles. All vehicles which are required to go to higher echelon shops for repair are inspected by regimental maintenance personnel.

b. In the field.—The maintenance platoon is organized to permit functioning in the field as a unit. Under exceptional circumstances it will be required to furnish detachments. The maintenance platoon is the last unit in the regimental column on the march and operates directly under the maintenance officer, who is able at any time to report to the regimental commander the location of the last vehicle in the column.

c. During marches.—When a vehicle falls out of the column the troop repair truck falls out with it. If the personnel of the troop repair truck cannot put the vehicle in running condition within a reasonable length of time (a few minutes), the troop chief mechanic instructs the driver to await the arrival of the regimental maintenance platoon. The chief mechanic of the regimental maintenance platoon, upon arriving at a disabled vehicle, makes a diagnosis and assigns a mechanic to perform the necessary repair. The maintenance platoon does not leave that location until the disabled vehicle is running or being towed. These disabled vehicles are collected with the maintenance platoon and the maintenance officer does not release them to join their organizations until he is able to forward them in groups under a competent noncommissioned officer. Under certain conditions the trouble having been properly diagnosed in the disabled vehicle, the maintenance officer may send the platoon forward while the particular vehicle is being put in repair. Upon arrival in bivouac the maintenance officer repairs vehicles that have been towed in unless unable to complete the job in time for the next day's march. He also receives reports from organization commanders through the motor officer of all minor repairs and adjustments necessary to be completed.

d. During combat.—When the regiment operates against a hostile force the maintenance platoon is usually left in rear at a point well removed from the sphere of activity where it sets up a semi-stationary service park. From this park it is

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able to repair vehicles and operate forward on missions of salvage. Under the direction of the motor officer the maintenance officer can locate and pick up disabled vehicles and return them to the park for repair. Normally, vehicles disabled in combat are brought to the main axis of movement where wreckers or other towing vehicles pick them up and return them for repair. The work of salvage under combat conditions is particularly hazardous but must be done efficiently and rapidly. Therefore, in combat the maintenance officer must have available under his immediate direction the entire equipment of his unit. In certain situations the regimental commander may direct wreckers to accompany the combat squadrons, although this method deprives the maintenance officer of his most efficient means of salvage and delays the accomplishment of his mission. It is sometimes practicable to send the wreckers forward on the axis of movement to be available more quickly. On long marches it is necessary to attach extra gasoline trucks to the maintenance platoon.

132. Supply.—The functioning of the service troop in the matter of supply is described in CFM, volume III.

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